

# CITY OF SEATAC CITY HALL

## ASSESSMENT & ANALYSIS FOR THE REDEVELOPMENT OF SEATAC CITY HALL

Prepared in accordance with the  
Agreement for Professional Services between  
City of SeaTac, WA and ARC Architects

March 2021





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## **TABLE OF CONTENTS**

EXECUTIVE SUMMARY

ASSESSMENT & RECOMMENDATIONS

CONCEPT OPTIONS

COST ANALYSIS

APPENDIX



## ***EXECUTIVE SUMMARY***

ASSESSMENT & RECOMMENDATIONS

CONCEPT OPTIONS

COST ANALYSIS

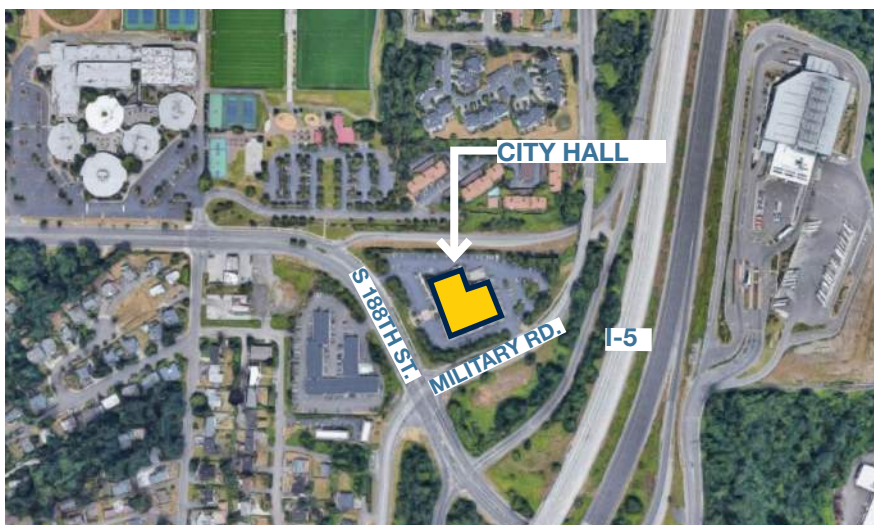
APPENDIX

## OVERVIEW

The City of SeaTac City Hall was first constructed in 1979 and underwent tenant improvements in 2002 with designs by David A Clark Architects. In July 2020, ARC Architects and its consultant team began a feasibility study that explores the City's future growth and aims to increase workspace efficiency by exploring modern workplace strategies and space use guidelines laid out by the State of Washington Office of Financial Management.

This study was performed in conjunction with a separate assessment and architectural analysis of the SeaTac Maintenance Facility located at 2000 S 136th Street out of which the maintenance divisions for the Parks and Public Works Department currently operate. Together, the feasibility reports for City Hall and the Maintenance Facility form an analysis that determines the potential design and cost implications of renovating the existing facilities to accommodate the City's projected growth as it rises from 29,000 in 2018 to 40,000 in the next several decades.

The City Hall building is located at 4800 S 188th Street in SeaTac, Washington immediately off Exit 152 on Interstate-5. The 3-story, 75,000-square foot building is owned by the City and houses City Hall staff on all three levels as well as commercial tenants, which are currently only located on the second level. In collaboration with the City and consultant team, ARC Architects assessed the conditions of the existing building and developed recommendations for a building program with space planning that meets the City's anticipated growth, yielding a renovated/expanded building that would last several decades - allowing the City staff to accommodate a population size of 40,000 - with a new structured parking building located at an undetermined satellite location in order to meet zoning requirements. The analysis also includes a feasibility-level cost estimate for the proposed building and site improvements, as well as a comparison cost of building a new city hall building at an undetermined location using current construction estimates for government buildings, and a conclusion and recommendations statement for future planning.



### GOALS AND OBJECTIVES

This study aims to determine the feasibility of redeveloping the existing SeaTac City Hall into a facility that complies with the reported improvements identified by the Department of Homeland Security, improves departmental workflow and interactions between the staff and public, and accommodates the City's population growth over the next several decades. To achieve this goal, consultants were brought on board to provide building assessments, identify code deficiencies, and recommend action items for maintaining building envelope, structural, mechanical, electrical, telecommunication, and budgetary integrity. Ultimately, the study illustrates pragmatic design opportunities for the city to meet growing demands and reinforces a welcoming interface between city staff and residents. This study also compares the cost of tenant improvements based on this study to the cost of new construction on an undetermined site.

### DELIVERABLES

A feasibility report that documents the following contracted scope of services:

1. Prepare a Facilities System Report (seismic, HVAC, plumbing, electrical, energy, etc.), for a complete evaluation of the existing building and systems due to age of structure and type of systems.
2. Evaluate the space needs (both existing and future) for all City Hall Departments and functions by understanding adjacencies, work flow, and technologies as additional tools used in the evaluation process.
3. Review the Department of Homeland Security Report along with the 2007 Seismic Report prepared by MLA Engineering (both provided by the City) to understand the safety, security, and structural issues with respect to existing/future schematics, layouts, and final design.
4. Prepare Schematic Plans of the options and alternatives with inclusion of seismic and facilities reports, a refined preferred Schematic Plan option including a preliminary project budget for evaluation and approval. The project budget should include preliminary and final construction drawings (hard costs), all permitting and administrative costs, project management, construction inspections, and all other costs necessary for a successful project (soft costs).
5. Prepare a comparison cost estimate for a new City Hall building for an undisclosed location using current construction estimates for government buildings, for comparison to the preferred Schematic Plan option estimate.

**COST ESTIMATE ASSUMPTIONS**

Costs are Construction Costs in Today's Dollars. Soft costs (design, permits, fees, FF&E, sales tax, construction contingency) are included at 45% of the overall construction costs. Escalation is not included.

The Owner should anticipate construction inflation at an annual rate of 3% from the present day to the construction midpoint month.

The above are high-level budgetary estimates based upon programmatic information and limited knowledge of existing conditions or future design.

Construction is based upon one continuous operation under one general contract. The estimate assumes working in a phased manner in the occupied building and it is captured within the renovation construction costs at 10%, or roughly \$2.9 million. This phasing factor is for construction only and does not account for any losses in the City's capacity to continue operating and providing public services during construction.

The estimate is based upon prices as of February 2021, with four to six responsible and responsive bids under a competitive bid environment for a fixed price contract.

**COST SUMMARY**

A more detailed explanation of project (soft/hard) costs, logistics and allocations can be found in the Cost Analysis summary and associated Appendix. The renovation construction cost includes a \$5.95 million seismic retrofit, a \$2.9 million phasing factor, relocating the existing restroom core, upgrading the egress stairs to meet building code, new ductwork, lighting, interior partitions, and architectural finishes.

The estimate for the structured parking garage does not account for any reductions in the number of parking stalls required by zoning. Such reductions are discretionary and would be determined during design and permitting. Furthermore, the estimate for the parking garage does not include costs for developing any commercial space that may be required by ordinance.

	Option A - Renovation/Expansion of Existing			Option B - New Construction Offsite		
	SQ. FT.	COST/SF	EXT.	SQ. FT.	COST/SF	EXT.
Renovation Construction Costs	77,153	\$428.21	\$33,037,686.13	0	\$0.00	\$0.00
Soft Costs		45%	\$14,866,958.76		45%	\$0.00
Subtotal			\$47,904,644.89			\$0.00
New Construction Costs	12,968	\$466.69	\$6,052,035.92	75,142	\$547.00	\$41,102,674.00
Soft Costs		45%	\$2,723,416.16		45%	\$18,496,203.30
Subtotal			\$8,775,452.08			\$59,598,877.30
Site Development Costs		(see estimate)	\$333,115.00		(unknown)	(unknown)
Soft Costs		45%	\$149,901.75		45%	(unknown)
Subtotal			\$483,016.75			(unknown)
Structured Parking Garage	82,250	\$140.00	\$11,515,000.00	82,250	\$140.00	\$11,515,000.00
Soft Costs		45%	\$5,181,750.00		45%	\$5,181,750.00
Subtotal			\$16,696,750.00			\$16,696,750.00
Grand Total			\$73,859,863.72			\$76,295,627.30



### CONCLUSIONS & RECOMMENDATIONS

*Facilities System Report / Homeland Security Report Compliance:* This report indicates deficiencies in the existing seismic, HVAC, plumbing, electrical, energy, security, building envelope and general building configuration to meet the desired goal of a 40-year building. The costs associated with meeting this goal included major reinvestment and/or removal and replacement of existing systems and structures (Option A), which yield modest savings when compared to building anew (Option B).

*Space Needs:* This report indicates that the preferred Schematic Plan option - the most comprehensive expansion/renovation option - which has required departmental adjacencies (i.e. physical adjacencies between departments on the same floor), a desired need to not separate departments over multiple floors, and mandatory departmental locations on certain floors (ex: Police Department to be only on the ground floor), yielded a building size that is larger than the program analysis calculations (need) for the 40,000 population goal. As a result, the cost of a larger renovated/addition building (Option A) with a lower \$/SF construction cost is comparable to a new construction, smaller building (Option B) that is designed to fit the program calculations and space needs requirements.

*Unknowns and Complications:* This report identifies notable high-level cost impacts for both the renovation/addition option (Option A) and building anew (Option B) that should be considered when comparing these the two apples-to-apples. Although Option A is sited on a property already owned or leased by the City, the space needs analysis indicates that the parking stall quantity requirements for the renovated/expanded building exceed what the property can accommodate. This report and estimate account for the project costs (hard and soft costs) to build structured parking (building only), but do not include property acquisition or related costs. All site development costs are directly tied to correcting deficiencies noted in the facility assessments. Option B is for building costs only, and does not include property acquisition or site development costs (either hard construction costs nor soft costs). Option A's cost estimate assumes that the building will be fully occupied during construction, increasing the \$/SF cost when compared to single-phased construction, but reducing unknown moving and temporary lease costs for relocating City Hall services to another property during construction. Option B's soft costs do not include unknown operational costs to maintain services within the existing City Hall during construction.

*Conclusion & Recommendations:* Option A, unless granted a variance for the parking stall deficiencies and/or project acquisition with new structured parking, does not have the capacity to house the parking required by the zoning ordinance. Parking aside, the costs associated with this option are the most affordable, yet include a series of higher risk unknowns such as modifications to existing construction and phased construction within an occupied building. In order to best compare Option A to B, it is ARC's recommendation to have the City of SeaTac consider expanding this study to test fit Option B at two or three potential site locations, working with the City to define and account for all currently unknown project costs. This study would also identify and resolve the parking stall / structure requirement for Option A, identifying the off-site parking site, associated costs, and any economic benefits associated with the development of a new parking structure and related commercial space.

ARC will continue to work with the City to develop and refine the design in accordance with the City's goals and objectives and provide the needed documentation as outlined in an amended or future Consultant Agreement.



Concept renderings for a redeveloped City Hall. Top: A new, two-story lobby with centralized stair to the second floor public counters for Finance, CED, and Public Works. On the second floor, a separate stair leads to the third floor, where a skylight brings in natural daylight into the interior spaces. Above: A typical open work space within a department includes a variety of touch down work spaces, including work stations, offices, quiet rooms, and flexible hoteling space.



EXECUTIVE SUMMARY

## ***ASSESSMENT & RECOMMENDATIONS***

CONCEPT OPTIONS

COST ANALYSIS

APPENDIX



## OVERVIEW

Though originally constructed in 1979, the City of SeaTac dedicated the building as its official City Hall on November 26, 2002. Tenant improvements were made in 2002 and a seismic evaluation was performed in 2007. For this feasibility study, an overall building assessment and analysis was performed by each discipline in order to inform concept design and space planning. The project team studied original drawings and visited the existing City Hall building to conduct a building and systems assessment. Architectural, civil, landscape, building envelope, environmental, structural, mechanical, electrical, and plumbing assessments of existing conditions and recommendations are provided in this report. These recommendations were used to guide in the concept design process for the new City Hall.

*Opposite: The existing City Hall building featuring the main entrance, structural concrete cores with vertical circulation, and (3) stories of office space.*

*Below: Architectural schematic rendering of a renovated Council Chambers.*



# ARCHITECTURAL ASSESSMENT

## OVERVIEW

Originally built in 1979, the City Hall building provides roughly 75,000 square feet of net usable space for the City and its tenants. Guided by Beckwith Consulting Group, ARC Architects and the directors of each department worked together to determine how the existing spaces are used and what needs are required as the City grows from a population of 29,000 to 40,000.

In August 2020, ARC Architects performed a walk-through of the building and noted qualitative and quantitative observations. It is of note that the majority of City Hall staff was working from home during the visit amidst the coronavirus pandemic. As such, this assessment of existing conditions does not fully address the typical experiential observations of City Hall and its staff. In addition, this assessment addresses the findings of the June 2019 DHS Infrastructure Survey Security & Resilience Report for the City of SeaTac City Hall.

## LEVEL 1

The first floor of City Hall currently houses Council Chambers, Municipal Court, Court Clerks, the Parks Department, Records, Police Department, locker rooms, and break room with outdoor access.

## LEVEL 2

The second floor of City Hall is currently occupied by two commercial tenants as well as the Human Resources and Legal Departments, a server room, and approximately 1000 sf of storage.

## LEVEL 3

On the third floor of City Hall is the Permit Center, Council Office, and Departments for Public Works, Community & Economic Development, Finance and Systems, and City Manager. There is also a server room, shared kitchen, and (3) conference rooms.

The size of the building can accommodate the growing needs of the City, but the current layout and flow of both inter- and intra-departmental spaces is inefficient and lacks the qualitative and quantitative characteristics of modern work environments and space use guidelines as outlined by the WA State Office of Financial Management. See the [State Facilities Workplace Strategies and Space Use Guidelines](#), published in May 2017.

## CODE ANALYSIS

The building is approximately 81,370 gross square feet and sits on a 2.63-acre site. The building is zoned for Commercial Business (CB) and is used as an office building.

## PARKING

With regards to the site, there are no limitations to the maximum allowable impervious surface area. The number of parking stalls required is based on office and assembly areas: 1 parking stall per 250 sf of office area plus one stall per 40 sf of fixed assembly municipal court area. The SeaTac Municipal Code differentiates between the amount of parking required by City Hall to that of a Police Facility. For the latter, one parking stall is required per employee, plus one stall for every 100 sf of public office area.

### Office Area (Excluding Police & Court)

First Floor Area	14,388 SF
Second Floor Area	21,362 SF
Third Floor Area	22,417 SF
Total Office Area	58,167 SF
Police Office Area	5,770 SF
Number of Police Employees	107
Municipal Court Assembly Area	1,445 SF

### Parking Stall Calculations

58,167 SF / 250 SF Office Area	233 Stalls
5,770 SF / 100 SF Police Area	58 Stalls
107 Employees * 1 Stall/Employee	107 Stalls
1,445 SF / 40 SF Court Area	37 Stalls
Total Parking Stalls Required	435 Stalls

Transit Availability Reduction (40%)	x 60%
<b>Total Parking Stalls Required</b>	<b>261 Stalls</b>

During our assessment, the Police Chief confirmed that patrol vehicles do not remain at City Hall; rather, they function as typical employee vehicles and are offsite during off-business hours.

Per Section 15.455.140, there is opportunity for Director's discretion in reducing the amount of off-street parking required when the site is regularly served by public transit. The bus stop at S 188th Street and Military Road S would allow the number of parking stalls to be reduced by 40%. With this reduction factored into the analysis, 261 parking stalls are required at City Hall.

Furthermore, per SMC 15.255.010(B), when building an addition to an existing building, meeting current parking standards may only be required relative to the additional square footages. This code section may or may not apply based upon the design option the City decides to pursue. Should it apply, additional parking stalls may not be required. According to the civil assessment, there is approximately 219 existing parking stalls at City Hall. Should the City pursue a building renovation, this deficiency will need to be addressed as a reduction to the required amount of parking is discretionary.

Below: From the Parks Department, the Riverton Room is located on the other side of the door that is shown. By code, egress from a room is not allowed to pass through adjoining or intervening rooms.



#### EGRESS

The exit stairs in the building are not compliant with current code. Per IBC 1011.5.5.3, stair risers are to be solid. The exception to this is if the opening between treads is less than or equal to 4 inches. The existing risers at City Hall are 4-7/8" and, therefore, do not comply with this except. The exit stairs throughout the building will need to be brought up to code should the City decide to pursue tenant improvements.

Per IBC 1016.2, egress through intervening spaces is not allowed except when such areas are accessory, are not a Group H occupancy, and provide a discernible path of egress travel to an exit. At City Hall, egress from the Parks Department is currently subject to an intervening space, the Riverton Room. This current layout does not comply with the building code and a new design to the layout of the facility must address this deficiency.

#### PLUMBING FIXTURE COUNTS

The number of plumbing fixtures as required by code is currently sufficient for how the spaces in City Hall are used. The table below illustrates the required plumbing counts for fixtures including water closets, urinals, and lavatories, and compares it to what is currently provided.

SUMMARY OF REQ'D TOTAL OCCUPANTS: 1138		This summary table tallies the individual fixtures as required by occupancy group(s) above into total required fixtures and compares that to the number of fixtures provided in the documents, see below									
		TOTAL WATER CLOSETS			TOTAL URINALS	TOTAL LAVATORIES			TOTAL BATHTUBS OR SHOWERS	TOTAL DRINKING FOUNTAINS	TOTAL SERVICE SINKS
50 % MALE	50 % FEMALE	UNISEX	MALE	FEMALE	MALE	UNISEX	MALE	FEMALE			
569	569	0	11	12	0	0	8	8	0	3	1
PROVIDED		1	10	16	6	1	13	13	2	3	3

#### ARCHITECTURAL OBSERVATIONS

There are notable physical and experiential characteristics of the existing City Hall that ARC Architects observed during its site visit in August 2020.

#### WAYFINDING

Generally speaking, there is a lack of wayfinding throughout the building, both between and within departments. There is security personnel off the main lobby adjacent to the municipal court room, but visitors are otherwise expected to know where to go within the facility. There is a front desk reception area that was unstaffed at the time of the visit. From an experiential perspective, the elevator lobby on each floor is the most open and public of spaces.

Circulation between departments is laid out circuitously and there is minimal signage throughout the building. Spaces that are accessible to the public sprinkled throughout the building, including the municipal court, chambers, permit center, and counters for police and municipal clerk. From both a security and wayfinding perspective, it is unclear which spaces are for staff only.

### OCCUPANT COMFORT

The elevator lobbies on each floor have an abundance of natural light; however, these spaces are under utilized. Depending on the time of day, these spaces may experience heavy glare and heat buildup. Furthermore, perimeter offices have access to natural daylight, controlled manually with blinds. Open work spaces do not have direct access to daylight.

Air quality appeared to be fine during the site visit. Windows do not appear to be operable and a significant number of office doors were left open. As Cities continue working through and beyond the coronavirus pandemic, air quality is expected to play an increasingly important role for building occupants. Acoustic applications throughout the building are managed via carpeting, acoustic ceiling tile (ACT), and work station wall partitions. No other forms of acoustic dampening were visibly present during the site visit. There were not enough employees working on site to determine whether more acoustics are needed.

### SPACE UTILIZATION

The existing use of space is generally inefficient. Offices and work stations are oversized in comparison to the guidelines from the WA State Office of Financial Management. Currently, there are 64 offices and 45 workstations. Across the 68,523 net square feet of office space, that results in approximately 628 square feet per workspace. According to the WA Space Use and Standards Report from July 2016, the average workstation size is 290 square feet and 323 square feet per user. As the existing floor plans and photos on the following pages illustrate, the existing spaces should be modified to make better use of the building footprint and increase workspace efficiency.

### **SECURITY ISSUES**

In the June 2019 DHS Security and Resilience Report, it was noted that the City Hall is performing below average when it comes to the Protective Measure Index (PMI). A number of recommendations were made as part of that assessment. These issues include the following:

- Public parking is located directly in front of the main lobby, which makes the City Hall vulnerable to vehicular assault. The recommendation per DHS Report indicates relocating public parking to be 400'-0" away from the primary entrance. This is not feasible on the existing site.
- City Hall has not been seismically retrofitted and should be modified per structural recommendations in order to increase building resilience. See Structural Assessment for more information.
- There is no fencing along the perimeter of the site, which increasing security risk and vulnerability. See landscape assessment for more information.
- There is a lack of perimeter video surveillance of the facility. See telecommunications assessment for additional information.
- There is (1) water discharge location for the facility. Should this ever fail, the City would be required to vacate the building until the connection is restored.
- There is (1) electrical service connection to the building.
- There are no redundant or separated servers. See telecommunications assessment for further information.

### **SECURITY RECOMMENDATIONS**

Based on the security issues identified, ARC Architects included the seismic retrofit, installation of perimeter fencing, and additional video surveillance in the cost estimate. Costs associated with addressing barriers to vehicular assault, modifying utility lines, and providing additional servers are not included.

- An alternative to the DHS recommendation that addresses vulnerability to vehicular assault is to install cable barriers in front of the building. This and other options can be further developed should the City choose to redevelop the existing building.
- The seismic retrofit, as outlined in the structural recommendation of this report is included within the cost estimate.
- ARC Architects recommends an 8'-0" perimeter fencing along with perimeter of the site, with two vehicular access gates. This is included in the cost estimate report.
- ARC Architects proposes adding video surveillance to the facility. This is included in the cost estimate report.
- Changes to the existing utility lines are not included in the cost estimate for this study. Temporary measures are recommended in lieu of redundant utilities. See Civil Assessment.
- This study does not propose providing additional servers; however, they can be provided at minimal cost.

## FIRST FLOOR PLAN

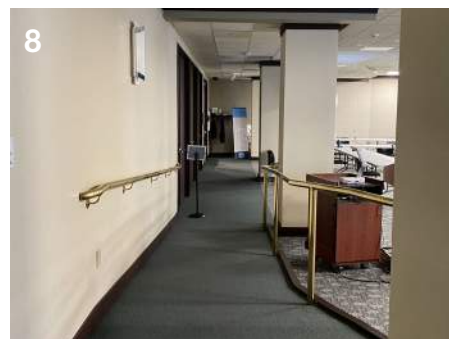
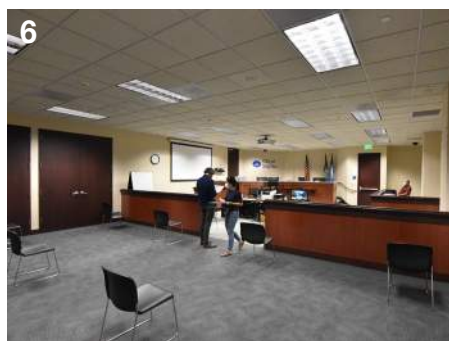
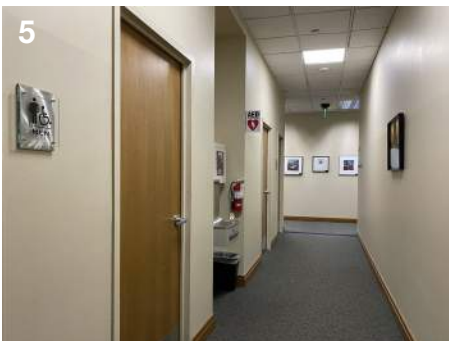
## PROGRAM

- COMMON
- COUNCIL CHAMBERS
- COURTS
- LEGAL
- PARKS
- POLICE





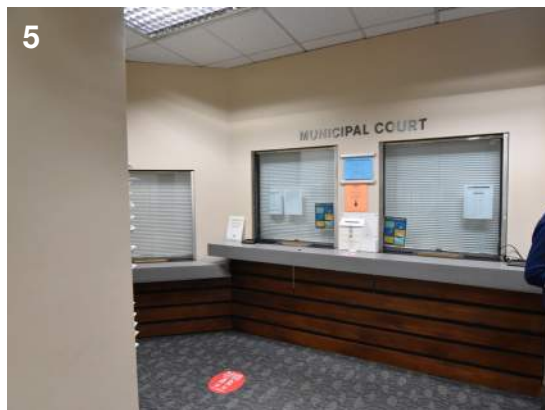
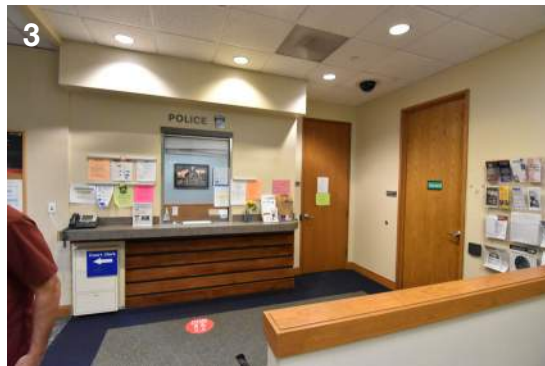
## FIRST FLOOR MAIN LOBBY, COURT ROOM, CHAMBERS, & RESTROOMS



1-2. Main entrance and lobby.  
3. Typical elevator signage with access to Riverton Room beyond.  
4. Front desk reception counter in the lobby.  
5. Typical corridor at restrooms.  
6. Municipal court room with (3) double doors connected to Council Chambers.  
7-9. Council chambers.

**FIRST FLOOR LUNCH ROOM, POLICE & MUNICIPAL COURT COUNTERS, & SALLY PORT**

1-2. The primary lunch room is located on the first floor and is accessible from the Parks Department and south corridor near the Police Department. The 930 square foot room has a stove, refrigerator, outdoor access, tables, and chairs. 3-4. Public counter to Police Department. Corridor faces south towards South Exit Stairs and main break room. 5. Municipal Court public counter is adjacent to the Police public counter. 6. The Police sally port located north of the building is accessible from Police Department only.





### TYPICAL CONFERENCE ROOMS

There are conference rooms of varying size and furnishings throughout the building. The second floor City Hall space includes a 360-square foot corner conference room and one large centralized room, approximately 765 square feet, that is accessible from both the Legal and Human Resources Departments. This room is not currently built out. Some meeting rooms are located along the perimeter with views to the exterior while other rooms are located more centrally in the interior of the building, with glazing facing circulation areas and private offices. Apart from the Police Department, there are 3 conference rooms ranging from 270 to 680 square feet on the first floor. On the third floor, there are 4 conference rooms, spread across the departments; these range in size from 330 to 450 square feet.

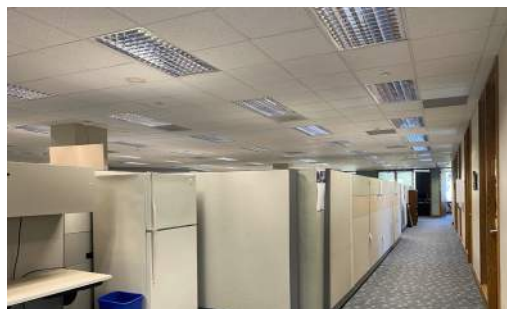
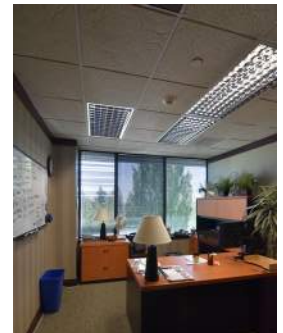




### TYPICAL OFFICES & OPEN WORK AREAS

Within each department, there are offices located along the perimeter of the building, open work spaces in the middle of the building, and circulation occurring between these spaces. The offices vary in size, from 125 to 605 square feet. They all have access to natural daylight with manual blinds that control how much of the daylight is brought into the space. The open work spaces do not receive natural light and exposure to it is dependent on whether individuals within offices decide to leave their blinds open or shut. Generally, most office doors were left open, indicating an open and inviting work environment.

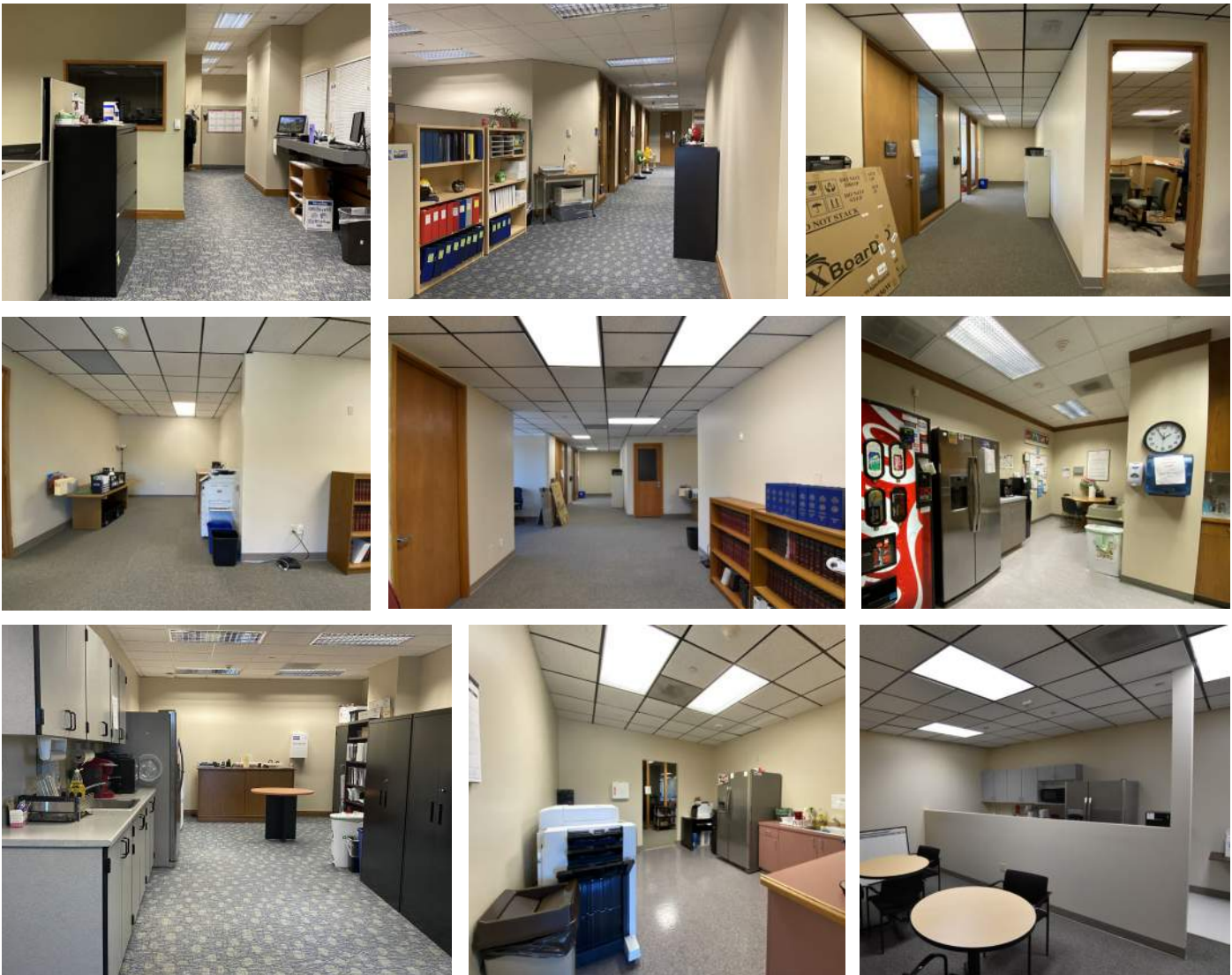
The open work spaces are separated with dividers of varying height (e.g. 36" and 72"), which help with privacy and isolating sound but can make wayfinding and bringing in natural daylight challenging. Like the private offices, the work stations vary in size, from 80 to 175 square feet. "Touchdown spaces" consist of conference rooms and smaller work areas that are embedded within the cubicles. These cubicles are also used to house shared equipment such as plotters, refrigerators, copiers, and filing cabinets.



### INTRA-DEPARTMENTAL CIRCULATION & TYPICAL BREAK ROOMS

Within each department, circulation is organized around offices, work stations, and touchdown spaces. These circulation zones are typically wide enough that they also serve as storage areas for paperwork, bookshelves, filing cabinets, and miscellaneous supplies and equipment.

The break rooms within each department vary in size from 200 to 325 square feet. Most break areas are located in enclosed rooms off the circulation; however, there is a smaller break area near the City Manager Department on the third floor that is not in an enclosed room. Some of the break areas also share their space with office equipment such as copiers and filing cabinets.





## ELEVATOR LOBBIES, THIRD FLOOR RECEPTION, &amp; PERMIT CENTER



1-2. The second and third floor elevator lobbies function as open waiting areas, but there is a lack of clarity and wayfinding direction for visitors upon arrival. In Image #2, the reception desk is located just beyond the elevator.

3. City of SeaTac Reception counter. Access to the Permit Center is located off to the left through an unsecured door.

4-5. The Permit Center is open to the department offices and work spaces.

6. Example of open work stations with 36" tall partitions.

## PROGRAM

- ☐ COMMON  
☒ HUMAN RESOURCES  
☐ LEGAL  
☐ PARKS  
☐ TENANT





# ARCHITECTURAL RECOMMENDATIONS

## OVERVIEW

To bring the City Hall building up to an acceptable standard for the next several decades, ARC Architects recommends several amendments for consideration. These amendments address wayfinding, spatial organization, code deficiencies, space utilization, acoustic performance, and access to natural light and fresh air. Furthermore, they address adaptable workspace styles that arise from innovations in technology, cultural shifts toward collaboration, and health and safety considerations brought on by the current Covid-19 pandemic. Addressing these issues amounts to a large-scale, potentially phased, tenant improvement project. For City Hall, a tenant improvement project would aim to -

- Provide an open circulation space that is well-ventilated and inviting.
- Utilize sight lines and graphical installation to improve wayfinding.
- Organize conference rooms so that staff do not need to enter another department to use them.
- Provide “open air” meeting and gathering spaces protected from harsh weather.
- Accommodate the projected growth of departments and City staff.
- Provide daylight and access to fresh air to areas that are cut off from access to the outdoors.
- Remedy existing code deficiencies.
- Provide the Community and Economic Development Department with a new public presence that ensures the security of the employees while meeting the needs of staff.
- Provide a diverse assortment of work spaces that meet current standards and accommodate changing workforce preferences as well as specific departmental requirements.
- Explore sustainability options including re-cladding the exterior or providing renewable power sources.
- Improve acoustic performance throughout the building.
- Improve space utilization performance by distributing various types of work spaces within and between departments, with an understanding that different departments have different spatial and functional needs.





### SPACE NEEDS

In collaboration with Beckwith Consulting Group, ARC Architects and the City projected departmental space needs by considering the City's population levels at 30,000, 35,000, and 40,000. Space needs are based upon the projected number of employees that will be staffed as the City continues to grow and it includes physical work spaces for employees as well as shared common spaces such as conference rooms, work areas, restrooms, and break rooms. Examples of different sized workstation are illustrated here.

The following table summarizes the projected staff numbers and the associated space needs (in net square feet) by department and population size. The complete breakdown of departmental programs can be found in the Appendix.

**TABLE 1.0**

#### Functional requirements - all departments

Building elements	Building reqmnt (nsf)		
	30.0	35.0	40.0
Common/Support Areas	9,729	10,858	12,115
City Manager	1,947	2,082	2,082
Community & Economic Dvpmnt	4,259	4,259	4,664
Finance & Systems	3,224	3,246	3,269
Human Resources	2,536	2,860	3,022
Legal Department	1,971	2,133	3,319
Municipal Court	4,636	5,004	5,333
Parks & Recreation - City Hall	1,597	1,597	1,759
Police	16,481	22,728	25,965
Public Works - City Hall	3,352	3,813	3,813
<b>Total</b>	<b>49,732</b>	<b>58,580</b>	<b>65,341</b>

### ADJACENCIES

Separately, ARC Architects, Beckwith Consulting Group, and the City met virtually to assess departmental adjacencies. This exercise allowed the directors of each department to express relationships and priorities between and within the departments.

Tables 2.0 and 2.1 on the following page illustrate the spatial relationships between departments and the significance of each relationship. Each item is distinguished by whether it's a permanently occupied space, such as an office or workstation, or if it's a temporarily used space, such as the IT server room or public counter.

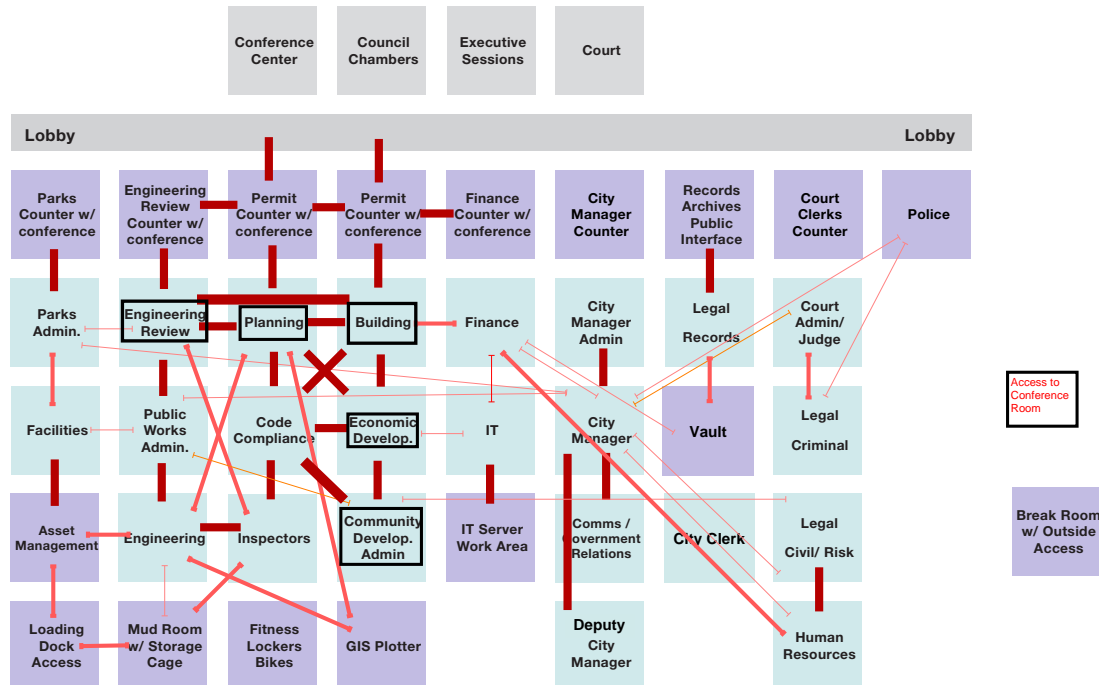
By abstractly identifying the ideal departmental relationships, each department then assigned the priority of each relationship, from most critical to no relationship whatsoever. ARC Architects synthesized this information into Table 2.1, which shows a web of bold, medium, and light lines indicating the level of significance between any two items. Items with no relationship are not connected by a line.

With this understanding of physical space needs and departmental adjacencies, ARC Architects began studying design options for the City to consider.

TABLE 2.0



TABLE 2.1





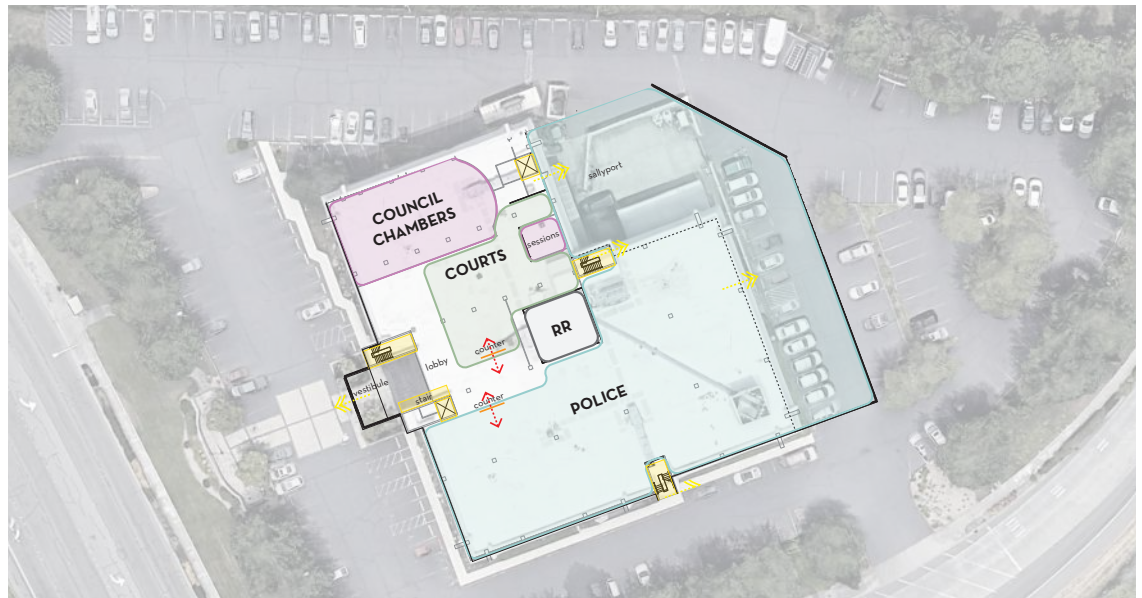
**RECOMMENDED DESIGN OPTION**

Using the results from the space planning and adjacency exercises, ARC Architects developed (4) renovation options that ranged from lowest construction cost to highest construction cost. These options explored the distribution of common and departmental spaces across the three floors of the existing City Hall building. The size of each space aligns with the City's projected growth of 40,000. Each design option has its programmatic and budgetary advantages and disadvantages - these are further detailed in the Concept Options portion of this report.

ARC Architects presented the four options to the Owner and City staff in December 2020. Based on the feedback received, ARC Architects recommends the most inclusive, comprehensive option, which includes an 11,280-square foot addition to the building. The addition emphasizes wayfinding by adding a new centralized stair that visually engages the three levels of City Hall and by relocating the existing restroom core on each floor.

This option also proposes cutting two openings in the existing floor plate in order to create double height spaces and enhance wayfinding. These double height spaces occur at the main entrance, council chambers, and second floor lobby. Given the sizable nature of the proposed addition, the existing parking deficiency, and the number of existing stalls that would be displaced by the building addition - as shown in the site plan - ARC Architects recommends an off site parking structure to meet the current zoning requirements. This study does not include a comprehensive code analysis of the recommended design option, but if an off-site parking structure is needed, then it may also need to be partially built out with commercial or service space.

Given the early pre-design nature of this study, the illustrated floor plans and schedule of spaces is largely a means to test feasibility and space planning. Should the City decide to move forward with renovating the existing building, additional schematic designs can improve workplace flow, departmental adjacencies, and any additional concerns that the City may have that have not yet been addressed in this study, including space utilization, acoustics, and existing egress code compliance issues, as described in the Architectural Assessment section of this report.



## ASSESSMENT & RECOMMENDATIONS

### PROPOSED PROGRAM

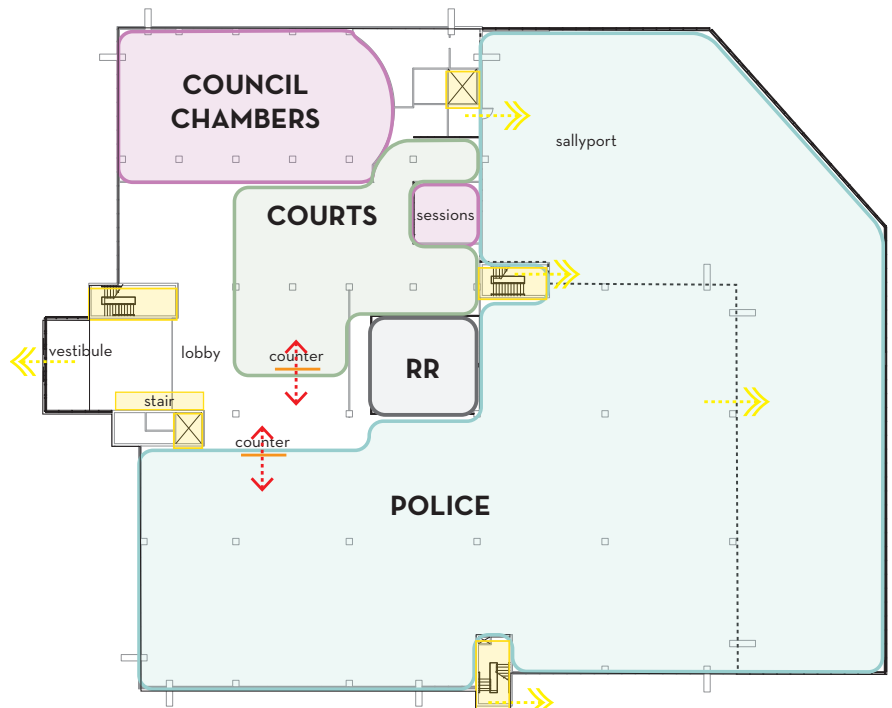
DEPARTMENTAL AREA - FIRST FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
ELEV	CIRCULATION	77 SF
WEST STAIR	CIRCULATION	203 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION	CIRCULATION	213 SF
CIRCULATION	CIRCULATION	217 SF
VESTIBULE	CIRCULATION	197 SF
CIRCULATION: 8		1287 SF
ELECTRICAL	COMMON	40 SF
RISER	COMMON	105 SF
RESTROOM	COMMON	79 SF
ELECTRICAL	COMMON	314 SF
STOR	COMMON	88 SF
RESTROOM	COMMON	328 SF
RESTROOM	COMMON	323 SF
JANITOR	COMMON	46 SF
ELECTRICAL	COMMON	88 SF
LOBBY	COMMON	2969 SF
COMMON: 10		4379 SF
SESSIONS	COUNCIL CHAMBERS	317 SF
COUNCIL CHAMBERS	COUNCIL CHAMBERS	3066 SF
COUNCIL CHAMBERS: 2		3382 SF
COURT ADMIN	COURTS	3091 SF
COURTS: 1		3091 SF
POLICE	POLICE	14211 SF
POLICE: 1		14211 SF
POLICE ADDITION	POLICE ADDITION	6335 SF
SALLYPORT & SECURED PARKING	POLICE ADDITION	4934 SF
POLICE ADDITION: 2		11268 SF
Grand total: 24		37618 SF

DEPARTMENTAL AREA - SECOND FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	77 SF
NORTH STAIR	CIRCULATION	203 SF
ELEV	CIRCULATION	64 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	161 SF
CIRCULATION: 5		663 SF
LOBBY	COMMON	4829 SF
CONFERENCE CENTER	COMMON	2821 SF
RESTROOMS	COMMON	826 SF
BREAK ROOM	COMMON	1077 SF
WELLNESS	COMMON	798 SF
COMMON: 5		10351 SF
CED	COMMUNITY & ECONOMIC DEVELOPMENT	4692 SF
COMMUNITY & ECONOMIC DEVELOPMENT: 1		4692 SF
FINANCE	FINANCE	3260 SF
FINANCE: 1		3260 SF
GREEN ROOF	OUTDOOR	10051 SF
OUTDOOR: 1		10051 SF
PUBLIC WORKS	PUBLIC WORKS	4088 SF
PUBLIC WORKS	PUBLIC WORKS	1888 SF
PUBLIC WORKS: 2		5975 SF
Grand total: 15		34993 SF

DEPARTMENTAL AREA - THIRD FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
EAST STAIRS	CIRCULATION	158 SF
NORTH STAIRS	CIRCULATION	203 SF
ELEV	CIRCULATION	77 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION	CIRCULATION	4057 SF
CIRCULATION: 6		4717 SF
CITY MANAGER	CITY MANAGER	2860 SF
CITY MANAGER: 1		2860 SF
STORAGE	COMMON	149 SF
RESTROOMS	COMMON	826 SF
CONFERENCE CENTER	COMMON	2465 SF
SERVER	COMMON	334 SF
RECORDS	COMMON	1179 SF
COMMON: 5		4953 SF
FLEX SPACE	FLEX SPACE	2272 SF
FLEX SPACE: 1		2272 SF
HUMAN RESOURCES	HUMAN RESOURCES	3128 SF
HUMAN RESOURCES: 1		3128 SF
LEGAL	LEGAL	3414 SF
LEGAL: 1		3414 SF
COVERED OUTDOOR SPACE	OUTDOOR	2372 SF
OUTDOOR: 1		2372 SF
PARKS	PARKS	2184 SF
PARKS: 1		2184 SF
Grand total: 17		25899 SF

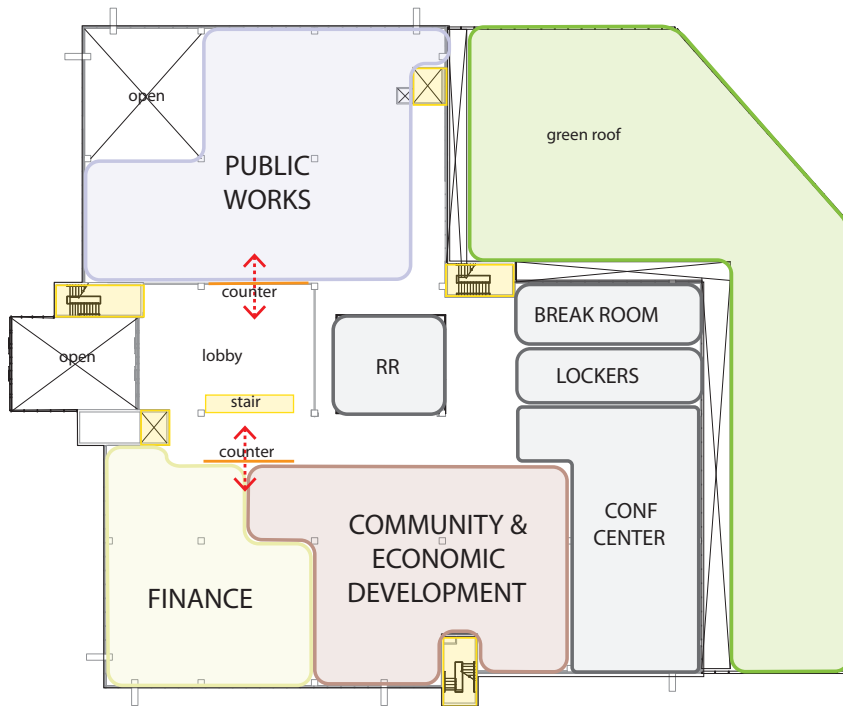


## FIRST FLOOR PLAN



This recommendation allows the Police Department to be located on the first floor and allows Council Chambers and the Courtroom to continue operating independently. An enlarged vestibule at the main entrance leads visitors into a welcoming, double height lobby with visual connections to the second and third floors. A new centralized stair allows patrons to easily access public services on these floors.

## SECOND FLOOR PLAN



The second floor houses the departments that have the most frequent interactions with the public. Based on the adjacency exercise with each of the directors, ARC Architects recommends public counters for Public Works, Community and Economic Development, and Finance. These counters provide the interface between the City and its constituents and they each face a large, open, double-height lobby. The staff break room, locker rooms, and a new conference center are also located on this floor. Above the single-story police addition on the first floor is an option to develop an accessible green roof. This outdoor space can be an extension of the staff break room. Should the City choose to rent out conference rooms to the public, the green roof can also be accessible to the public.



### THIRD FLOOR PLAN



From the second floor, a new centralized stair connects to the third floor, where departments with fewer interactions with the public are located. Specifically, these departments include City Manager, Human Resources, Legal, and Parks, Community Programs and Services. As requested by the Owner, this option keeps the existing server room in its current location on the third floor. The proposed server room is smaller than the currently oversized room.

There is ample space on the third floor to accommodate the City's projected growth needs beyond what this pre-design has explored (i.e. beyond a population of 40,000). As such, there is approximately 3,400 square feet of space that can be allocated for future use as needed by the City. There is an additional 2,300 square feet of existing building space that could either be set aside for future use or developed into a green roof or covered outdoor space. Lastly, this option considers adding a skylight to the third floor, above the two-story lobby on the second floor. A skylight will bring in abundant daylight to an otherwise dark, interior space, which will add to the overall sensibility of an active, engaging, and welcoming atmosphere for the City and its visitors.



### STRUCTURAL IMPROVEMENTS

The recommended option proposes removing (2) sizable portions of the existing floor plate in order to create double height spaces in the second floor lobby and in Council Chambers. Structurally, this requires the stiffening of slabs along the openings as well as additional beams at Council Chambers to resist wind loads along the exterior and additional collector beams to support the third floor above the lobby.

### MECHANICAL IMPROVEMENTS

In addition, the mechanical scope of the first floor police addition would cost approximately \$80/sf for a standalone VRF system, plumbing and fire protection throughout the building. A VRF system was used for baseline cost only, further analysis outside the scope of this report is required to determine a system type for the facility.

For further information, see the Mechanical Recommendations section of this report.



## CIVIL ASSESSMENT



### OVERVIEW

The project site is bounded by South 188th Street to the north and west, and Military Road South to the east and south. The existing site is approximately 2.9 acres and consists of a building located on the center of the site that is surrounded by a surface asphalt parking lot. There are two driveway entrances to the site. One entrance is from the southeast side of the site via Military Road South and the other entrance is from the northwest side of the site via South 188th Street. The existing concrete curb around the parking lot is in good condition. The asphalt pavement shows signs of moderate cracking that has been previously addressed with sealant.

According to City records, there appears to be 219 general surface parking stalls and seven ADA parking stalls within the surface parking area. It appears that the site contains approximately 88% impervious areas and 12% pervious areas. The recommendation in the Infrastructure Survey Security and Resilience Report to locate general public parking spaces at least 400 feet from the building is not achievable with the current property. The City will need to relocate the City Hall to another property in order to achieve this protective measure.

The capacity of the existing utilities was preliminarily evaluated, although this will need to be revisited in a later design phase. Due to the increased efficiency of modern fixtures replacing the existing fixtures it is unlikely increased capacity will be required.



*Top: Satellite aerial of City Hall with South 188th Street to the north/west and Military Road to the east/south.*

*Middle: West vehicle entrance.*

*Right: South vehicle entrance; steeply sloping driveway from Military Road into parking lot. Neither access entry has an existing gate or barrier nor perimeter fencing that extends to the vehicle opening.*

### **STORM**

Stormwater runoff generally sheet flows through the site from north to south and drains into several catch basins in the parking lot and the drive aisles. Runoff from the existing building and the site is captured and conveyed through the on-site stormwater conveyance system that ultimately discharges to an existing 36-inch stormwater main crossing Military Road South. We anticipate that the existing stormwater discharge location will be sufficient for this project's proposed improvements. The limited improvements are not expected to trigger flow control, Low Impact Development (LID) best management practices (BMPs), or water quality treatment facilities in accordance with the current stormwater requirements.

### **SANITARY SEWER**

According to City records, there are existing sanitary side sewers that are currently serving the existing building. The sizes of the existing side sewers are unknown, but they discharge to an existing 8-inch sanitary sewer main within South 188th Street. We anticipate that the new construction can reuse the existing sanitary side sewers; however, the capacity of these lines will have to be evaluated and confirmed during design. Given the fact that more capacity will likely not be required, no cost was associated with this item in the estimate.

With regards to the DHS report requesting redundant utilities it is not standard practice to provide a permanent alternate sanitary sewer discharge service. However, dependency concerns for sanitary sewer (wastewater) can be addressed by renting temporary waste holding tanks that collect and transport wastewater offsite.

### **WATER**

According to City records, there are domestic and fire service connections to the building that are served by an existing 16-inch water main within South 188th Street. The size of the existing domestic water service line is 3 inches, and the size of the existing fire service line is 8 inches. The existing service lines and meters will have to be evaluated to determine if they can be reused for the new project. Given the fact that more capacity will likely not be required, no cost was associated with this item in the estimate.

With regards to the DHS report requesting redundant utilities it is not standard practice to provide a permanent alternate water service but dependency concerns can be addressed through measures such as trucking in potable water, should the water service not be functional.

### **GAS & POWER**

According to the records, there are no gas main lines in the immediate vicinity of the site. There are existing power poles and underground electrical conduits along the property lines. We anticipate that the existing power service point of connection can be maintained; however, this will need to be evaluated and confirmed by the Electrical Engineer during design. Given the fact that more capacity will likely not be required, no cost was associated with this item in the estimate.

With regards to the DHS report requesting redundant utilities, similarly, the feasibility of installing a second electrical service to serve the building will need to be evaluated by the Electrical engineer but it is expected that a second below grade electrical service route is feasible.



# LANDSCAPE ASSESSMENT

## PERIMETER SECURITY

The only existing perimeter fencing is located along the northern edge of the SeaTac City Hall property. The eastern portion of the fence is 7' tall chain link, and meets the 7' tall steel picket fence approximately 60' west of the northeast property corner.



1. Northeast property corner where chain link fence meets guardrail at Military Road. 2. There is an approximately 12" gap where the chain link fences meet the picket fence. 3. Facing west, the picket fence continues along the length of the northern property boundary to the west end of the parking. 4. At the western terminus of the picket fence, facing east, the fence does not tie into other perimeter security and planting outside of the fence intrudes into clear space. 5. Facing SSE between parking lot and Orillia Road, north of vehicle entry, ample landscape buffer exists to install additional perimeter fencing. 6-7. Facing WSW between parking lot and Military Road, north of vehicle entry, ample landscape buffer exists to install additional perimeter fencing. 8. Facing SSE between parking lot and Orillia Road, south of vehicle entry, ample landscape buffer exists to install additional perimeter fencing. Recommend coordinating fencing with the flagpole plaza and sign wall.

### PARKING

There is unrestricted vehicle circulation around the entire perimeter of the building, with some parking areas signed for specific use. The front of the building that faces Orillia Road, offers designated accessible parking, visitor parking, and City Council parking. Other restricted parking spaces exist for electric vehicles and City vehicles. The primary parking use in the northeastern area of the parking lot is used for police and sheriff parking. All other parking is open and unmarked, except for signage against Park and Ride use and towing warnings. Four-hundred feet of distance between building and visitor/general parking is not possible on this site.



1. Visitor parking west of main building entrance. 2. Accessible parking at main building entrance and bollards at entry plaza. 3. City Council parking south of the main building entrance. 4. Electric vehicle parking at northwest corner of building.

### LIGHTING

Street and pedestrian scale light occurs throughout the site with inconsistent lighting coverage due to spacing and vegetation. Additional or improved lighting could be installed near vehicle access points and at building ingress/egress locations.



*Example of lighting obscured by vegetation*



# ENVIRONMENTAL ASSESSMENT

## OVERVIEW

EHS-International, Inc. (EHSI) conducted a Limited Hazardous Materials Survey of the SeaTac City Hall building that includes asbestos-containing materials (ACM), lead containing paint (LCP), PCB-containing light ballasts, mercury containing fluorescent light tubes, and other regulated materials. This survey was performed in accordance with federal, state, and local regulatory requirements. Each regulated material included in the survey is summarized below.

EHSI was provided with two ACM reports for the site. A survey performed by Northwest Abatement Services; Inc. dated November 11, 2016 was written as a comprehensive building survey. This survey collected 46 bulk asbestos samples and found no asbestos. Samples were collected from various types of vinyl floor tile and mastic, gypsum wallboard, and ceiling tiles. Another survey conducted by NOW Environmental Services; Inc. dated June 24, 2010 was labeled as a project-specific survey for the roof renovation. Four samples were collected of the existing built-up roofing and no asbestos was detected in these samples.

## ASBESTOS-CONTAINING BUILDING MATERIALS

EHSI collected 276 samples of suspect ACM at the Site. Additionally, 12 samples were sent to a second laboratory for quality control (QC) purposes. Of the 276 samples, laboratory analyses revealed 12 samples of nine homogenous materials contained greater than 1% asbestos. Several of the materials that do not contain asbestos are adhered to ACM and must also be assumed to be contaminated with asbestos in the event those materials are removed or disturbed for demolition purposes. Specific sample locations of the suspect materials can be referenced in Sample location figures SL-1 through SL-5.

The following ACMs or assumed ACMs were identified at the Site:

- ~50 SF Brown mastic\* under 1'x1' vinyl composite tile with fibrous backing (multi-colored) over yellow mastic on concrete in the lunchroom on the first floor.
- ~50 SF – Black and yellow mastic\* under carpet in hallway outside the secure area
- 6 EA – Yellow mastic on wall hanging blue fibrous wall panels.
- Yellow mastic\* on concrete floor under carpet in the Human Resources area second floor.
- ~200 SF – Vinyl composition tile and black mastic\* on concrete in Human Resources area under construction.
- ~150 SF – Black mastic on concrete\* under 2 layers of vinyl tile, 1'x1' gray vinyl tile & yellow mastic and 1'x1' gray vinyl tile.
- 75 SF – Flexible joint (white) on air handling unit on roof.
- 75 SF – Flexible joint (black) on air handling unit on roof.
- 50 SF – Red mastic on air handling unit on roof.
- Electrical equipment with assumed ACM internal components located throughout the building. Electrical equipment and wiring were energized and were not sampled.

\*Several of the ACMs have estimated quantities and should be assumed to be in more locations than found by our survey because they are covered by other flooring layers including carpet or other floor tiles.

### LEAD-CONTAINING PAINT

OSHA considers any detectable concentration of lead to be a potential hazard during construction or demolition activities. EHSI completed a limited lead assessment of the building. None of the samples collected were identified with a measurable concentration of lead.

The OSHA Lead in Construction Standard applies to construction-related tasks that impact any detectable level of lead. During renovation or demolition activities, we recommend that the contractor use precautions and follow health and safety guidelines, since all painted surfaces within the project area are considered to contain detectable levels of lead. It is recommended that the provided paint chip sample results be used in conjunction with other applicable data (e.g., air monitoring) to evaluate the potential for elevated occupation lead exposures during demolition activities.

### POLYCHLORINATED BIPHENYL LIGHT BALLASTS, MERCURY, & OTHER REGULATED MATERIALS

As part of the survey for regulated materials, EHSI quantified the number of light ballasts and other installed regulated materials that may classify as universal hazardous wastes or other regulated wastes. These materials include mercury-containing items such as fluorescent light tubes, high-intensity discharge lighting, thermostats, and switches. Other regulated materials included CFC-containing items, and possible tritium-containing exit signs. All identified magnetic ballasts are assumed to contain PCBs. A similar assumption applies to mercury that is potentially present within fluorescent lamps and fluorescent light fixtures.

Generally, it is not necessary to sample these materials because their presence within the building represents a future cost for disposal of the facility's installed contents. The following regulated materials were identified at the Site:

- Potential mercury-containing fluorescent light tubes: 1,164 EA
- Potential PCB-containing light ballasts: 633 EA
- Refrigerators with assumed CFCs: 6 EA
- Drinking fountains with assumed CFCs: 3 EA
- Exit Signs (non-electronic): 3 EA





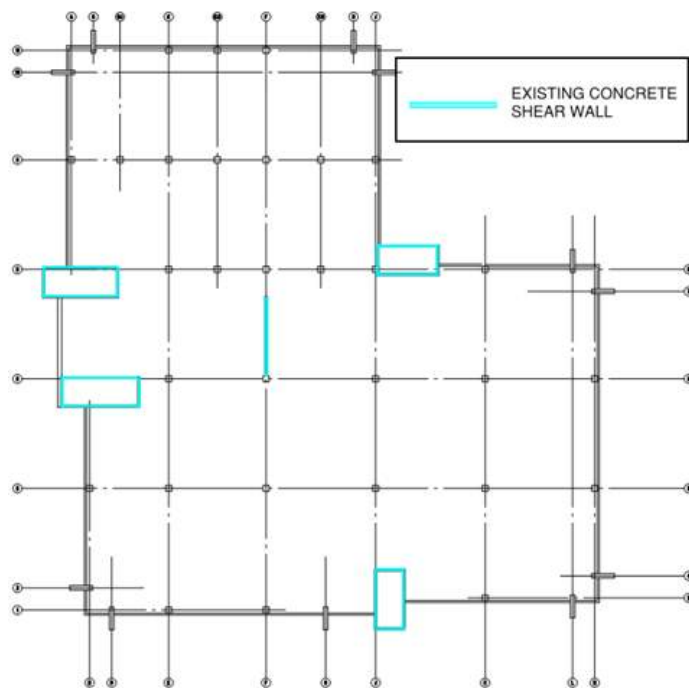
# STRUCTURAL ASSESSMENT

## EXISTING BUILDING DESCRIPTION

The construction of the SeaTac City Hall building was completed in 1979, designed under the Unified Building Code (UBC), 1973 Edition. It is a three-story building, approximately 91,300 square feet in size, with a square shaped 188 ft x 188 ft footprint containing an approximately 70 ft x 70 ft notch out of the northeast corner.

The gravity loads are resisted by a structural system consisting of cast-in-place concrete slabs and joists for the second floor, third floor, and roof, supported by a system of cast-in-place concrete beams and columns.

Lateral loads are resisted by cast-in-place concrete shear walls, primarily located around each of the stairwells and the elevator shaft, as well as an approximately 28-foot long interior concrete shear wall that is continuous from the 1st floor slab to the roof deck. This interior wall is located along grid F, between grids 6 and 7. Existing shear walls are shown below in light blue.



## PRELIMINARY SEISMIC EVALUATION, 2007

A seismic evaluation was previously completed by MLA in 2007 using the procedures presented in ASCE 31-02 Seismic Evaluation of Existing Structures. Two performance objectives, as defined by ASCE 31-02, were investigated as part of this study. The first objective, Life Safety, was equivalent to the seismic performance of a new building constructed in this time period. The second objective, Immediate Occupancy, was equivalent to the seismic performance of a new hospital, fire station, or police station constructed at this time.

MLA determined that the City Hall building does not meet the ASCE 31-02 Life Safety nor Immediate Occupancy performance objectives. Observed deficiencies included overstressed concrete shear walls, noticeable cracks in the concrete walls, and diaphragms with insufficient capacity to deliver the design loads to the shear walls. These deficiencies were found at both the Immediate Occupancy and Life Safety performance objectives.

The recommended scope of repairs included the construction of new concrete shear walls with foundation elements, strengthening of the boundary elements of existing concrete shear walls, adding diaphragm collector elements to the floor and roof slabs to help deliver the loads to the shear walls, reinforcing the diaphragms around large openings, and repairing the concrete wall cracks by epoxy injection. The required repairs were found to be similar between Immediate Occupancy and Life Safety, though with Immediate Occupancy, they were required to be more robust. Please refer to the report Seismic Evaluation of the SeaTac City Hall by MLA, dated October 11, 2007, for more detailed information.

[illegible]



# ENVELOPE ASSESSMENT

## OVERVIEW

On September 2, 2020, a building envelope specialist from Wetherholt and Associates, Inc. visited the City Hall building to perform an evaluation as part of the overall facility condition assessment. Visual evaluation of the roof, exterior walls, and related flashings was performed; review of the windows, curtain walls, and glazing systems was not included. One roof core was performed and temporarily patched. Exterior walls were assessed from the grounds with the use of binoculars or a ladder. No records of building envelope repairs nor roof replacement were made available for review. The weather at the time of evaluation was clear and about 68 degrees Fahrenheit.

From online research and onsite discussion with the Facilities Manager, Brian Ruda, and Tom Atkins of the City of SeaTac, the following items are understood to be relevant to this building envelope assessment:

- Water intrusion has been known to occur within the front stairwell (West Stairs) during heavy rain events. No other known leaking was reported.
- Based on historical aerial imagery, the original roof appear to be either a smooth surfaced built-up roof (BUR) or EPDM roof system. In 2002/2003, a cell site antenna and associated rooftop equipment was placed near the SE corner of the roof and near the south elevation of the east staircase penthouse, respectively.
- In 2006/2007, modifications to the cell site equipment appeared to have been made, including a larger shrouded platform and possibly additional antennae.
- A white reflective roof membrane was installed in 2010/2011, likely the one currently installed, which may carry a warranty.

The full report with additional photographs can be found in the Appendix.

## ROOF OBSERVATIONS

The roof area, including the staircase penthouse, measures approximately 26,285 square feet. Based on the core cut, the roof system assembly consists of concrete deck, asphalt flood coat, about 3.5-inches of rigid polyisocyanurate insulation, single-ply membrane, ¼-inch DOW extruded polystyrene insulation (XPS), and a mechanically fastened single-ply membrane.

The type of single-ply roofing membrane was not able to be identified during the site visit. Roofing is terminated at the parapets with adhered single-ply wall flashing membrane and standing seam stainless steel coping. The coping was observed as being at risk of blowing off in several locations due to not being engaged into the cleat along the exterior return. This has likely contributed to some water intrusion into the interior of the building. The cleat also serves as a roof-to-wall flashing that is lapped by the wall flashing membrane and extends out over stainless steel roof panels as an overhang around the majority of the building perimeter. The stainless steel roof panels themselves were observed to be in good condition, with the exception of gaskets between panels that are deteriorating and displaced.

At cast-in-place walls that extend perpendicular to the parapet and partially bisect the roof, the wall flashing membrane is secured along the top edge with mechanically fastened termination bar and is covered with a two-piece reglet and counterflashing metal. The exposed cast-in-place wall above the roofing terminations has some cracks, which could allow water migration behind the roofing and has allowed for migration into the building.

The counterflashing installation is excluded where the termination bar turns vertical at the leading edges of the wall flashing membrane. The exposed termination bar and coping-to-wall junctions appeared to be susceptible to water intrusion. There are no transition “saddle” flashings where the parapet meets a cast-in-place wall. Instead, the wall flashing membrane and coping metal are simply tabbed up behind the counterflashing metal.

Slope for drainage is provided in a 4-way configuration toward each of (7) 3.5-inch diameter cast iron drains. Slope appeared to be a minimum of ¼-inch per foot. However, some evidence of standing water was observed in spot locations in the field of the roof and between sleeper curbs that are set perpendicular to the slope. There are no overflow drains.

The east staircase penthouse roof showed several deficiencies with the roofing installation:

- Wall flashing membrane folded down back onto itself along the east perimeter
- The wall flashing membrane does not extend down the outside edge nor is it sealed/integrated to the scupper
- The coping cap is in poor condition and top fastened

Along the north perimeter of the east staircase penthouse roof, the concrete slab transitions to a steep slope and has what appears to be an acrylic coating applied to the exposed surface of the concrete. The coping metal along this perimeter transitions to a peak edge flashing that extends out over the sloped roof section. The peak edge flashing is corroded, with lifted ends and sealant-dependent joints. Evidence of leakage was observed by streak staining within the staircase penthouse.


Penetrations through the roof include vent stacks, conduit, ducts, support stanchions and sleepers. Vent stacks are flashed with preformed boot flashings that are hot-air welded to the roof membrane and terminated with a band clamp around the pipe.

Conduit and support stanchions, including those for the cell site platform and ducts, are flashed with pourable sealer inside a square clad-metal pocket. The clad-metal pocket appeared to be flanged out onto the roof where hot-air welded membrane is used to integrate with the roof. The pocket flashings were observed to have the pourable sealer separating from the edges and/or sumped, a common issue with these types of flashings, which could allow water to collect or infiltrate the roofing.

Duct penetrations appear to extend through a larger curbed opening. The curb height is relatively low in comparison to the industry standard of 8-inches. Wall flashing membrane integrates the curb with the roof membrane and sheet metal provides the transition from curb to duct. The sheet metal is sealant dependent at the miters and where it terminates against the duct.

Sleepers appeared to be wrapped or baseflashed with wall flashing membrane and capped with stainless steel sheet metal. The sleeper detailing looked appropriate with the exception of isolator springs and other components being fastened through the top surface of the caps that require routine maintenance to the sealant. Similar to the sleepers, a sheet metal cap is installed under the curb or platform where the cell site equipment is placed. Anchor points through the cap are susceptible to water intrusion and where the anchor was shifted leaving a fastener hole.



*Figure 1 – Historical aerial image of roof from 6/2010 showing apparent BUR or EPDM assembly. Approximate location of core cut performed is denoted with  symbol.*





### EXTERIOR WALL OBSERVATIONS

Exterior elevations are primarily made up of double glazed aluminum framed strip windows between cast-in-place fin walls and a fluted CMU base. Between the rows of strip windows, overhangs protrude out at an 8:12 slope with ribbed stainless steel panels returning down across the front to create a band around the building.

Weep holes were observed in the bottom edge of the panels as they return inwardly at the soffit. The cast-in-place walls are painted and exhibited some cracking, which is common for this type of construction. Cracks can allow water migration behind flashings or other building components similar to that described for the condition above the roof line. The cast-in-place walls are not capped with coping metal.

The strip windows contain a sub-sill and a head flashing below the soffit. Weeps are present in the bottom portion of the frame that are covered with debris and need clearing out. Where the stainless steel panels meet the cast-in-place fin walls, surface mounted counterflashing is installed to provide an overlap of the L-metal transition flashing that extends under the last panel at each end. The surface mounted counterflashing is reliant on sealant to provide a seal to the wall along the top edge. The installation of butyl tape is typical behind the counterflashing at the fastening flange, but could not be visually confirmed. Issues with failing sealant were observed along the top of the surface mounted counterflashing. Adhesively failing sealant was observed at joints between the window jambs and cast-in-place walls.



# ENVELOPE RECOMMENDATIONS

## ROOF

Based on the observations, the roof system should remain serviceable for another 5 years with routine maintenance and implementation of recommended repairs. The main concerns are the dependency on sealant at roof terminations, which should be considered a regular maintenance item, and the moisture identified in the roof adjacent to the cell site equipment.

The following repair and maintenance items should be considered in an effort to reduce potential leakage and promote serviceability of the roof:

- Cut out and remove all wet insulation and replace with new to restore the roof assembly.
- Top off all clad metal pockets with pourable sealer to allow water to runoff.
- Routinely monitor and replace all exposed sealant where craze cracking or adhesively failing.
- Rework/replace the parapet coping metal to ensure full engagement with the cleat and proper mechanical securement.
- Replace deteriorated or loose gaskets between metal roof panels.
- Provide a seal at fasteners through the sleepers and pan flashings.
- Seal hole(s) left in pan flashing from removed or relocated fastener.
- Remove all the coping and peak edge metal at the perimeter of the east staircase penthouse roof to allow for new wall flashing membrane to be installed well adhered, wrapping over and extending down the exterior edge. Replace the scupper box with a flanged clad-metal scupper that can be fully integrated and sealed with the new wall flashing membrane, and install an independent collector box with an overflow opening. In conjunction, review options for coating, or roofing, the sloped concrete roof portion of the staircase penthouse or continuing the single-ply membrane installation in a fully adhered manner down to cover the sloped roof. Coating or single-ply membrane should extend down the outside face to cover the cold joint between slab and wall where water intrusion is occurring with mechanically fastened edge metal terminations.
- Consider coating all exposed concrete surfaces with a high build vapor permeable elastomeric coating and installing a standing seam metal coping on the cast-in-place walls.

The roof should be re-evaluated at the 5 year mark from date of this report (October 14, 2020) to verify if additional service life can be expected. A more extensive survey for moisture intrusion should be considered in the near future to identify the extent of entrapped moisture that needs removal and replacement with new dry roofing components to restore.

At time of reroof, the possibility of “skinning-off” the single-ply membrane(s) and salvaging the insulation could be an option based on the results of a moisture scan. The addition of rigid polyisocyanurate insulation to comply with current energy code requirements and a high compressive strength coverboard, both fully adhered, should be included as part of a new roof assembly. Further, options for providing overflow drains and applicable uplift resistance should be reviewed and provided as needed.

## EXTERIOR WALLS

The exterior walls should provide weatherproofing for the life of the building given that the following recommendations be considered and Items 2 - 4 are implemented every 3 to 5 years:

1. Refasten the surface-mounted counterflashings where fastener is backing out near the southwest corner of the building.
2. Routinely monitor and replace all exposed sealant where craze cracking or adhesively failing around windows and along the top of surface mounted counterflashings.
3. Clean out all weep holes in the window sills.
4. Similar to the walls above the roof line, consider coating the exposed cast-in-place concrete with a high build vapor permeable elastomeric coating.
  - Cladding the concrete walls with an assembly that includes a weather resistive barrier (WRB) and siding panels would provide a more long-term less maintenance prone condition. However, this option is considerably more intrusive and expensive, and would require replacing windows in order to flash and integrate the WRB into the rough openings.

# ELECTRICAL ASSESSMENT

## OVERVIEW

The purpose of this assessment is to determine the current condition of the electrical systems, identify code deficiencies, and recommend actions required to extend the useful life of the building by 40 years. Stantec reviewed available as-built construction documents of the facility and performed a walkthrough of the site on September 2, 2020. The existing conditions of major existing systems were visually inspected and are documented in this report. Due to the age of the building, major replacements to the existing electrical systems will be required to extend the life of the building.

Expected useful life of equipment was determined using the 2017 Replacements Book 1.1 published by the US Bureau of Reclamation. Most electrical equipment was found to be original to the facility's construction. In general, electrical equipment has an expected useful life of 30-40 years when properly maintained. As such, the majority of electrical equipment, including the building main switchboard, has exceeded its useful life and is recommended to be replaced at this time. Additionally, some life safety systems, including fire alarm and emergency egress lighting, were identified as deficient or having reached end of useful life. These systems should be prioritized for replacement.

In general, the building electrical systems are installed in compliance with current locally adopted codes with the notable exception of the energy code. The current systems do not meet the requirements of the upcoming 2018 Washington State Energy Code (WSEC), which takes effect on February 1, 2021. Renovations and additions to the building will require installation of new lighting and control systems in compliance with the WSEC as discussed further in this report.



*Building main switchboard located in the main electrical room. The NED required working space in front of the switchboard should be kept clear of foreign objects.*

## ELECTRICAL SERVICE

SeaTac City Hall is provided with a 1200A, 480/277V, 3-phase, 4-wire electrical service fed from a Puget Sound Energy (PSE) pad mounted transformer located on site near the north corner of the building. Based on markings on the enclosure, the transformer is rated for 500 kVA. The service entrance conductors are routed underground from the transformer to a service entrance rated automatic transfer switch (ATS) mounted to the building exterior which feeds the building main switchboard in the main electrical room on the 1st floor located at the north corner of the building. It is assumed the service disconnecting means is located in the exterior ATS, though this was not able to be confirmed during the initial walkthrough and should be verified.

## ELECTRICAL DISTRIBUTION

Refer to the Appendix for one-line diagram of the electrical distribution system. Power is distributed throughout the City Hall from the building main switchboard, a 1200A, 480/277V Square D Power-Style main lug only switchboard that is original to the building's construction. The switchboard contains a total of six fusible switches labeled as follows:

- 400A – “Penthouse”. Serves mechanical penthouse distribution panel that feeds roof mechanical equipment loads.
- 400A – “Panels L1, L2, and L3”. Serves building lighting loads.
- 400A – “Panels H1, H2, and H3”. Serves building mechanical equipment loads.
- 400A – “480-110/208 Transformer”. Feeds a 225 kVA 480-208/120V transformer that serves building plug loads.
- 200A – “Elevators”. Serves the two building elevator feeders.
- 200A – “New 480/277V Panel and Transformer”. Feeds Panel H1-1 which serves building HVAC loads and a 75 kVA transformer that serves building plug loads.



Additionally, a 100A fused disconnect switch is fed from a tap off the switchboard feeder that supplies Panel XH. Panel XH appears to originally have fed the building egress lighting loads, though all breakers labeled as such have been turned off. Presently, the panel serves a heat pump and a 5 kVA 480-120/240V single phase transformer that feeds Panel XL which in turn feeds a single fire alarm panel circuit. Both panels and the transformer are original to the building's construction.

The 225 kVA transformer supplied from switchboard fused switch "480-110/208 Transformer" is located directly adjacent to the main switchboard and feeds Panel SDP, an 800A, 120/208V main lug only distribution panelboard. Panel SDP contains three 225A, 3-pole breakers that feed the building north, central, and east 208V, 225A risers. Panels A, B, and C form the north 208V branch panel riser, each a 225A, 120/208V main lug only branch panelboard with feed-thru lugs aligned vertically in electrical closets on the north side of the 1st, 2nd, and 3rd floors respectively. Similarly, Panels D, E, and F are aligned vertically in the central building electrical closets and Panels G, H, and I are aligned vertically in electrical closets on the east side of the building. Panels SDP, A, B, C, D, E, F, G, H, and I are all original to the building's construction.

Panels H1, H2, and H3 form the mechanical equipment branch panel riser, each a 400A, 480/277V main lug only branch panelboard with feed-thru lugs aligned vertically in the central electrical closets on the 1st, 2nd, and 3rd floors respectively. All three panels are original to the building's construction.

Panels L1, L2, and L3 form the lighting branch panel riser, each a 400A, 480/277V main lug only branch panelboard with feed-thru lugs aligned vertically in the central electrical closets on the 1st, 2nd, and 3rd floors respectively. All three panels are original to the building's construction.

Panel Penthouse, located in the rooftop mechanical penthouse, is a 400A, 480/277V, main lug only panelboard fed from the main switchboard that feeds HVAC equipment located in the penthouse and outside on the roof. The panel also feeds a 50 kVA 480-120/240V single phase transformer located in the penthouse that supplies AT&T owned equipment on the roof. Panel Penthouse is original to the building's construction.

The fused switch in the main switchboard labeled "New 480/277V Panel and Transformer" feeds Panel H1-1, a 250A, 480/277V main lug only branch panelboard located in the 1st floor central electrical closet. Panel H1-1 provides the normal power feed to the ATS ahead of Panel HP, further discussed below in the Standby Power section of the report. Panel H1-1 also feeds a 75 kVA 480-120/208V step down transformer which serves Panel J, a 200A, 120/208V main circuit breaker branch panelboard. A 100A, 3-pole circuit breaker in Panel J feeds adjacent Panel JA, a 100A, 120/208V main circuit breaker branch panelboard. Both Panels J and JA serve building plug loads on the 1st floor. Panel H1-1 and J are modern Square D type NF and NQOD panelboards respectively and were manufactured in 1996. Panel JA is a modern Cutler-Hammer Pow-R Line 1a panelboard manufactured in 2002. Replacement parts for all three panels are readily available.



*Top: Building lighting control panel located in the first floor central electrical closet.*

*Bottom: Panel SDP, the primary building 208V distribution panelboard.*





### STANDBY POWER

The City Hall is provided with optional standby power from two generators on site, a Kohler 600 kW 480/277V diesel generator with sub base fuel tank of unknown size located outside near the north corner of the building and a Kohler 80 kW 480/277V diesel generator with a 238 gallon sub base fuel tank located outside at the police station sally port. The 80 kW generator was installed as part of the 2003 police station renovation. The date of installation of the 600 kW generator is unknown, but it appears to be newer than the police station generator. As currently installed, both generators meet the code requirements of NEC 702 for an optional standby power system. The 600 kW generator contains a 3-pole 1000A circuit breaker which feeds the ATS ahead of the building main switchboard, providing standby power for the entire building. The 80 kW generator contains a 3-pole 125A circuit breaker that feeds Panel HP, a 480/277V, 100A main circuit breaker panel, via an ATS located in a closet in the police station portion of the building. The ATS is supplied with normal power from a 100A, 3-pole breaker in Panel H1-1. Panel HP serves various lighting loads throughout the building as well as a 45 kVA 480-120/208V step down transformer that feeds Panel LP, a 120/208V, 125A main circuit breaker panel. Panel LP serves plug loads throughout the police station portion of the building. Panels HP and LP are modern Eaton Pow-R Line 1a and 2a panelboards manufactured in 2003, models with readily available replacement parts.

An 80A, 3-pole breaker in Panel LP feeds Panel XC, located in the 3rd floor main telecom room. Panel XC is a 120/208V, 100A main circuit breaker panel backed up by a 40kW 208V uninterruptable power supply (UPS) that feeds receptacles serving telecommunications rack equipment in the room. The UPS is provided with an external maintenance bypass switch to allow it to be taken offline for service without interrupting power to equipment served by Panel XC. Panel XC is a modern Cutler-Hammer Pow-R Line 1a panelboard manufactured in 2002. The 40 kW UPS is an APC Symmetra PX, a model currently in production with replacement parts available, that was manufactured in 2012.

### LIGHTING AND CONTROLS

The interior lighting at City Hall consists largely of recessed parabolic and acrylic lensed 2x4 and 2x2 troffers as well as a mix of compact fluorescent and incandescent source downlights and track-mounted accent lights. Per conversations with facilities personnel, existing 2x4 troffers have been retrofit with LED replacement tube lamps and most 2x2 troffers have been replaced with LED flat panel fixtures. In general, all interior lighting is controlled via local line voltage toggle switches. In some open office areas, ceiling-mounted occupancy sensors have been installed for auto-on/auto-off control.

Exterior and general area lighting consists mostly of building canopy mounted lensed downlights with compact fluorescent sources and pole and post mounted area lights. Per conversations with facilities personnel, the pole mounted shoebox type area lights around the parking lot have been retrofit with LED replacement lamps. Exterior lighting circuits originate from a Leviton Control Keeper lighting control relay panel located in the central electrical closet on the 1st floor and are provided with automatic control via timeclock and exterior photocell. Exterior and site lighting improvements are understood to not be included under the scope of building concept development at this time.



Top: The 600 kW diesel generator at the north corner of the building.

Middle: The 80 kW diesel generator at the police station sally port.

Bottom: The ATS fed from the 80 kW diesel generator and Panel HP.

### EMERGENCY LIGHTING

Emergency egress lighting is provided throughout the building mostly via individual emergency battery ballasts installed at select fixtures along the path of egress. In stairwells, “bug-eye” battery backup emergency lighting units are provided at every other stair landing. Exit signage consists of a mixture of green LED edge lit exit signs with battery backup, and green and red incandescent thermoplastic exit signs that do not appear to have battery backup. The thermoplastic exit signs appear to be original to the building’s construction. Battery backup of emergency lighting independent of the standby generator system is required to meet building code egress lighting requirements.

### FIRE ALARM

The facility is protected by an addressable fire alarm system. The Fire Alarm Control Panel (FACP) is a Cerberus Pyrotronics (Siemens) MXL panel located in a corridor near the main lobby. Horn/strobe notification devices are provided as required by Washington State Fire/Building Codes throughout the building. Full spot type smoke detection is provided throughout the building, though full smoke detection is not required by code for a fully sprinkled building. Manual pull stations are provided at all building exits, though only a single pull station is code required. Tamper/flow switches and addressable modules are provided at the fire sprinkler risers to monitor the status of the fire protection system and a water flow bell is located on the exterior of the building at the riser room.



*Top: Typical lighting fixture and emergency lighting unit installed in stairwells at alternate landings*

*Middle: No lighting fixtures installed at alternating landings in stairwells. It is unlikely that code required minimum emergency egress lighting is provided.*



# ELECTRICAL CODE DEFICIENCIES & RECOMMENDATIONS

## ELECTRICAL SERVICE

No major upgrades to the building HVAC system outside of equipment replacement in kind and minor modifications to the existing system are understood to be included under the scope of building concept development. As such, an increase to the existing building electrical service capacity is not anticipated at this time.

## ELECTRICAL DISTRIBUTION

In general, the electrical distribution equipment throughout the building is original to the building's construction and has surpassed its expected useful life of 30 years. In order to extend the useful life of the building 40 years, it is recommended that all original electrical gear, including the main switchboard, panelboards, transformers, enclosed circuit breakers, and disconnect switches, be replaced at this time. Feeder wiring should also be replaced in parallel with the gear, though existing raceways can be reused to the extent possible. All other panelboards and transformers installed during later building renovations are currently within their expected useful life and are not recommended to be replaced at this time, though conditions should be reevaluated in 15-20 years.

In many electrical closets throughout the building, including the main electrical room, the central electrical closets on all three floors, and the 3rd floor main telecom room, areas in front of panelboards were observed to be used for miscellaneous storage. The working spaces required by NEC article 110.26 shall be kept clear at all times. It is recommended that all foreign objects in code required work spaces be removed immediately.



*Top: First floor central electrical closet area in front of Panels J and JA and the associated transformer is being used for storage. The NEC required working space in front of panelboards should be kept clear of foreign objects.*



Panel QO, a 100A, 120/208V load center located in the 2nd floor central electrical closet is not provided with NEC article 110.26(A) (1) minimum clearance of 36" in front of the panel. Due to the lack of available wall space in the closet, it is likely the load center will need to be relocated somewhere outside of the closet in order to meet code clearance requirements.

Panel B, located on the 2nd floor and part of the north 225A, 208V riser, is installed flush in an alcove and is not provided with NEC article 110.26(A)(2) minimum clear working space width of 30" in front of the panel. It is recommended the panel be relocated when replaced to meet code clearance requirements.

Arc flash hazard warning labels as required by NEC article 110.16(A) were observed to be missing or to be taped on the interior of panelboards. These labels are required to be installed on the outside of the panelboard such that they are visible without needing to open the panel door. Disconnect switches and flexible conduit connections to some roof top air handling units appear to be original to the building's construction and show visible signs of rust and degradation. It is recommended that conduit and disconnect switches be replaced when the air handling units are replaced.

*Bottom: Panel QO in the second floor electrical closet. NEC-required working space depth of 36" is not provided. Working space in front of panelboard should be kept clear of foreign objects.*



Controlled receptacles are not currently installed in the building. The current WSEC requires that 50% of receptacles in offices, conference rooms, copy rooms, or break rooms be automatically switched off via either a local occupancy sensor or a time-of-day operated control device. While no action is required at this time, additions or renovations that add or alter usage of these space types will require installation of WSEC compliant controlled receptacles.

### STANDBY POWER

Based on visual inspection during the facility walkthrough, the standby generators appear to be in good physical condition. Detailed maintenance and testing logs were not reviewed at the time of the walkthrough, though facilities personnel indicated the generators are exercised monthly. Both generators are within their expected useful life of 35 years, provided they are properly maintained and regularly tested, so replacement is not recommended at this time. The condition of the generators should be reevaluated as their ages approach 35 years. The 40 kW 208V UPS located in the 3rd floor main telecom room is approaching the end of its expected useful life of 10 years. While no immediate action is recommended, it is expected the UPS will require replacement within the next 5 years.

### LIGHTING AND CONTROLS

The lighting controls presently installed throughout the building are mostly original to the building's construction. As a result, alterations to building spaces that add walls or require rework or additions to existing lighting circuits will necessitate an upgrade to current WSEC compliant lighting controls in areas of renovation. These additional lighting controls may include, but are not limited to, vacancy sensors (manual-on/auto-off control), lighting reduction controls (dimming), time clock shutoff, and daylight responsive dimming controls. In order to extend the useful life of the building, no action is recommended at this time to upgrade or replace existing lighting controls.

Many of the existing lighting fixtures are original to the building's construction and utilize older, less efficient lighting sources. As lighting technology has advanced, the WSEC has reduced lighting power densities for these building types over the last few code cycles. As a result, alterations that replace 50 percent or more of the lighting in a space will require compliance with the total connected lighting power limits of the WSEC in those spaces. This will likely require installation of new LED source lighting fixtures throughout areas of renovation. The recent retrofit of 2x4 fixtures with LED lamps has extended the useful life of much of the building lighting and lighting fixtures installed as part of the 2002 tenant improvement project are currently within their expected useful life of 35 years.

In order to extend the useful life of the building, replacement of all lighting is recommended in spaces where renovations or repairs to building elements, such as ceiling replacement, are performed. Lighting fixtures that are original to the building have exceeded their expected useful life and should be prioritized for replacement. Additionally, energy conservation incentives offered by PSE for LED retrofit and replacement may offer opportunity to reduce installation costs and should be considered.

### EMERGENCY LIGHTING

The following deficiencies and recommendations relate to life safety systems. Corrective action should be prioritized regardless of building upgrades or renovations.

The green and red thermoplastic incandescent exit signs located throughout the building appear to be original to the building's construction, do not appear to be provided with emergency battery backup, and are past their useful life. All thermoplastic exit signs should be replaced with battery backup green LED edge lit signs to match those currently installed in most of the building.

The "bug-eye" emergency lighting units installed in stairwells appear to be original to the building. These units utilize inefficient incandescent sources and have exceeded their expected useful life of 10 years. It is recommended to replace all emergency lighting units with new LED source units. Additionally, the emergency lighting units are only provided at alternating stair landings and it is unlikely that the code minimum of 1 footcandle average is provided along the path of egress. It is recommended that an additional emergency lighting fixture be provided at landings without one currently.





At exterior exits, no emergency egress lighting is provided, a violation of the International Building Code section 1008, as adopted by the Washington Administrative Code (WAC). It is recommended that an emergency powered lighting fixture be provided at all building exits, either via a new light fixture with battery backup or installation of emergency inverters to provide battery backup to existing exterior fixtures.

### FIRE ALARM

The fire alarm system presently installed is compliant with current local adopted code and there are no reported issues. The fire alarm control panel, a Cerberus Pyrotronics (Siemens) MXL panel, has been discontinued and has surpassed its expected useful life of 15 years. It is expected that replacement parts will become expensive and difficult to obtain in coming years. It is recommended that the fire alarm control panel and system components as necessary be replaced within the next five years.

### MISCELLANEOUS

The following items are miscellaneous code violations or safety deficiencies noted during the site walkthrough. As such, these items should be prioritized for correction regardless of building upgrades or renovations. In the 1st floor central electrical closet, an open junction box with exposed wiring was observed adjacent to Panel D. A cover plate should be installed to protect from accidental contact with live conductors.

In accordance with NFPA 72 section 10.6.5.2, the branch circuit breakers serving fire alarm equipment power supplies should be marked red and provided with an approved breaker locking device.

Presently, the building main electrical room is provided with a single egress door that swings inward to the room. While likely code compliant at the time of installation, current NEC article 110.26(C)(3) requires that the door swing outward in the direction of egress and be provided with panic hardware. It is recommended that the door to the electrical room be replaced to meet current NEC requirements. Additionally, as only a single egress is provided and due to the size of the switchboard installed in the room, the depth of working space in front of the switchboard is required to be 7'-0", twice the depth normally required by code. As such, the size of replacement gear and existing room conditions must be carefully studied to ensure code compliance.



*Top: Building fire alarm control panel located in a corridor near the main lobby.  
Above: Open junction box adjacent to Panel D in first floor central electrical closet should be provided with a cover plate.*

## TELECOM ASSESSMENT

### OVERVIEW

With the exception of the Community Center, Valley Ridge Community Center, and City of SeaTac Maintenance Shop, each of which has their own video security system servers, the SeaTac City Hall Building telecommunication service is home to all servers and systems for the city. The telecommunication service is supplied from underground copper and fiber cables and the main server room and main distribution frame (MDF) is located on the third floor. The intermediate distribution frames (IDF) are located in a stack in the core of the building, one per floor. At all floors, the telecommunications infrastructure is collocated with the electrical distribution. There are some other ancillary dedicated telecom spaces throughout the building that are dedicated to specific tenants or areas. Although the cabling generally has been upgraded, the topology and installation execution is less than optimal.

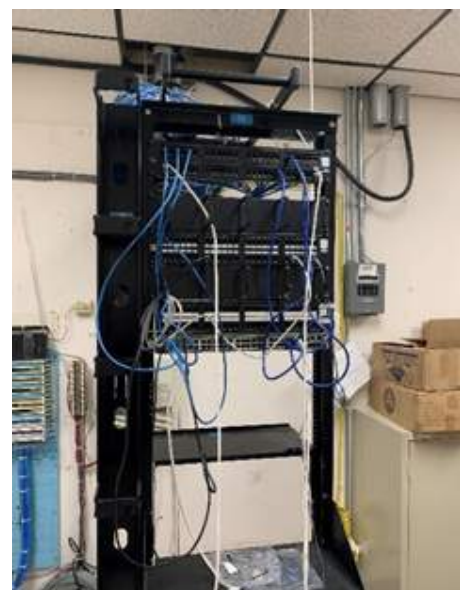
### TELECOMMUNICATIONS SERVICE & SPACES

The SeaTac City Hall is served by Single Mode fiber optic cable feed and copper phone service through underground service. The main server room and main distribution frame (MDF) is located on the third floor and is home to all servers and systems for the city. The power is conditioned through a full room Uninterruptable Power Supply (UPS) System that is environmentally controlled. The stacked intermediate distribution frames (IDFs) are collocated with electrical spaces, which are not climate controlled.

*Left: Environmentally-controlled server room UPS system. Middle: Typical IDF room - not well-organized or climate controlled. Right: Second floor north IT space.*



*Above: Third floor main server room and main distribution frame houses all servers and systems for the city.*





### BACKBONE DISTRIBUTION

The campus fiber service is routed to and terminated in the server room. Backbone fiber is distributed from the server room to the various IDFs. Copper phone service is distributed directly through the IDF stack. Cable TV via coaxial cable is distributed from the server room as well. There is a cell tower located on the roof of the building which also has associated cabling utilizing the same IDF stack. It is unclear which conduits and cables are supporting this equipment.

### HORIZONTAL DISTRIBUTION

The horizontal cabling to the work area outlets is all terminated in rack mounted telecommunications panels according to current standards. Network switches mounted in same racks provide connectivity for end user equipment



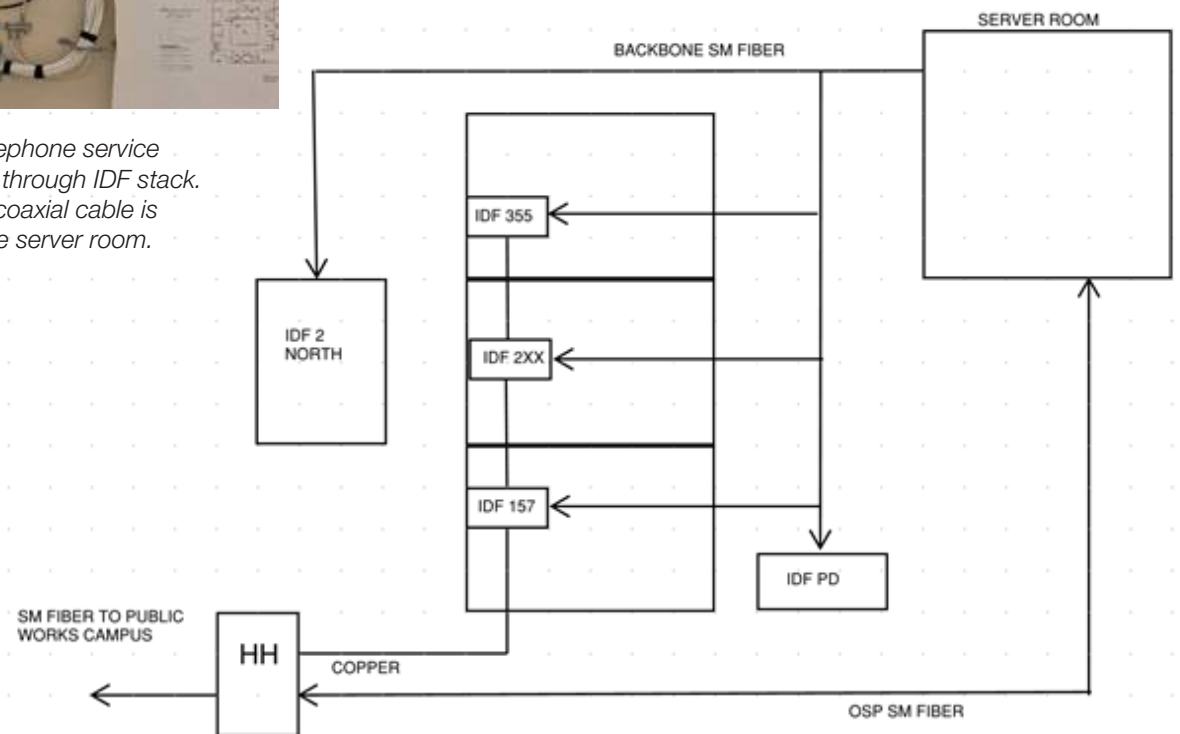
### ACCESS CONTROLS

The main access control system is located in the server room of City Hall. The local access control panels are distributed around the building. The local control wiring is all terminated in the wall mounted panels in the closest telecommunication space.

### VIDEO SURVEILLANCE

The main video surveillance system is located in the server room of City Hall. Cameras are mounted near entrances and various locations throughout the building. The local camera wiring is all terminated in horizontal panels in the closest telecommunication space.

Above: Copper telephone service distributed directly through IDF stack.  
Left: Cable TV via coaxial cable is distributed from the server room.





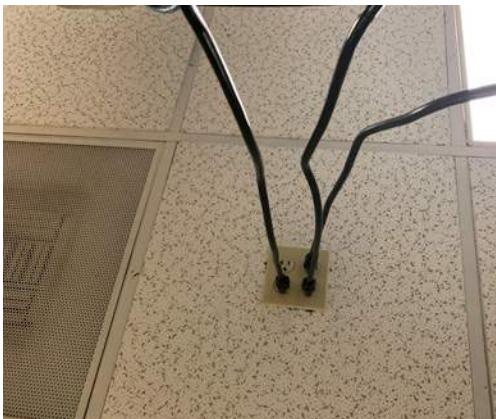
# TELECOMMUNICATIONS DEFICIENCIES & RECOMMENDATIONS

## TELECOMMUNICATIONS SPACES

The server room has adequate space and a proper UPS system; however, power distribution and grounding will require some upgrades. Power should be distributed via an organized manner where Power Distribution Units (PDU) are connected directly to AC power receptacles in a safe manner. The images below illustrate power receptacle and extension cord connections.

The server room Secondary Bus Bar (SBB) does exist; however, the bar is the wrong type and the wrong terminal lugs are in use. Additionally, each rack should be bonded in accordance with TIA-607-D. See the diagram on the following page.

The stacked IDF spaces are collocated with electrical distribution and are not environmentally controlled. Recommend the three stacked space should be separated from the electrical distribution rooms and be provided with environmental controls. Additionally, the new spaces should be provided with proper cable management and grounding.



*Top: Server room power receptacles to equipment racks. Middle: Server room rack power connected with extension cord. Above: Server room SBB is the wrong type with incorrect terminal lugs.*





### IDF GROUNDING

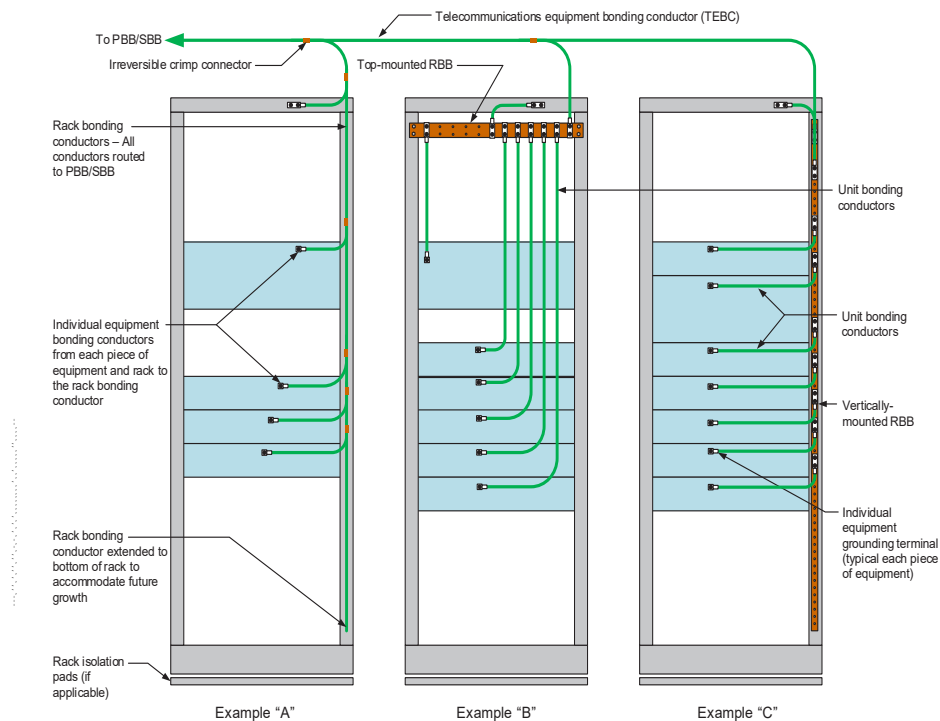
There is no telecommunications Secondary Bonding Busbar (SBB) in several IDF telecommunication spaces. Recommended one be installed at each telecommunication space in accordance with TIA-607-D (Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises) and bonded to the electrical ground.

### HORIZONTAL DISTRIBUTION

The horizontal structured cabling is generally in compliance with current standards, however, the execution of the installation is not done in an organized manner. If the space is to remain as collocated with electrical, recommend adding vertical cable management and organization of patch cables. Additionally, provide proper grounding per previous topic.

### MISCELLANEOUS

Over the years the building has gone thru several owners and has hosted various tenants both before and since the city ownership. There are numerous instances of infrastructure that is no longer in use and has been abandon in place. Recommend a cable survey be accomplished in concert with the SeaTac City IT group to identify and mark all telecom cabling in the building.



# MECHANICAL ASSESSMENT

## OVERVIEW

This report provides the City of SeaTac with an assessment of the existing mechanical, plumbing and fire protection systems in the SeaTac City Hall. Also included is an envelope analysis of the walls, roof, and windows in relation to energy savings. The current envelope system is used as a baseline and improvements (increases to insulation and window ratings) are modeled for potential energy savings.

FSi examined existing HVAC, plumbing and fire protection infrastructure at the SeaTac City Hall. The evaluation focused on the condition of existing equipment to establish the remaining service life based on ASHRAE's Equipment Service Life recommendations. Service life provides an average lifespan where equipment can be expected to perform as designed without significant maintenance such as a motor or coil replacement. In addition, we provide facility improvement measures (FIM) to increase the lifespan of the building 40 years.

Overall, the HVAC system in the City Hall is robust and functioning. We recommend keeping the mechanical system type in place and replacing equipment as needed. A water source heat pump system can be extremely reliable and produce a high efficiency when properly maintained. These systems are not common in modern day design due to high installation cost. However, since the water piping and cooling tower are already installed, replacing individual units would be significantly cheaper than installing a new system such as a VRF. With proper care and maintenance, a WSHP system will last much longer than a VRF system and the entire system is not dependent on one type of refrigerant. A new VRF system would require thousands of feet of new copper pipe, a large amount of refrigerant, and refrigerant safety monitors to be installed in the existing building.

A summary of existing mechanical equipment and their remaining service life can be found in the Appendix. Following the assessment, FSi found some of the equipment well past its expected service life, most notably the ventilation units (MAUs/AHUs) and some of the water source heat pumps. Due to the age of these units, components will begin to or have already failed. Replacement parts will be increasingly difficult and expensive to procure. To meet the 40-year facility improvement goal, this equipment should be replaced as soon as possible. In addition to some of the WSHPs being past their expected life, occupants frequently complain that some rooms are too hot while others are too cold. We recommend the WSHPs be rezoned to increase occupant comfort.

Other HVAC recommendations included in this report are to replace the condenser loop pumps and provide VFDs, replace the electric boiler, replace the server room cooling system with a single unit and refurbish the fluid cooler in 7-10 years followed by a replacement in 15-20 years.

The plumbing system in the City Hall is functioning well and is well maintained. There are significant opportunities for water savings as some of the existing fixtures use rates of flow much higher than modern fixtures. We also recommend increasing the temperature of the hot water system to 140°F to prevent legionella growth. Finally, due to the age of the water heater and circulation pump, we recommend replacing both in 5-10 years.

The fire protection system is functioning and has been inspected annually. With maintenance and inspections, a wet system like the one at the City Hall can last many years. Our only recommendation to help meet the 40-year facility plan is to replace the sprinkler heads in the next 10 years to meet NFPA 25 recommendations.

FSi also provided recommendations for envelope upgrades related to insulation and windows at the City Hall. The goal of these recommendations is to increase the energy efficiency of the facility. The windows and roof present the greatest opportunity for energy savings. Adding code minimum insulation to the roof and replacing the windows will lead to the largest energy savings and HVAC load reduction in the building.

### HVAC AIRSIDE

The City Hall consists of three levels with a mix of office and chamber spaces on the first floor and offices on the second and third floor. Three air handling units on the roof of the facility (MAU-1, MAU-2 and AHU-2) supply and exhaust ventilation air. The units have single speed belt driven fans with electric duct heaters tempering the ventilation air. The airflow and coil capacities are not known.

The rooftop MAUs and AHU appear to be in operating condition. They most likely have had several coil and motor repairs/replacements to remain operational given their age. The exterior unit casing is degraded with paint chips and rust. While the ductwork on AHU-1 appears relatively new, the ductwork for MAU-1/2 is rusting and sagging with pooling water on top.

Two split systems, CU-1/AC-1 and CU-2/AC-2, provide cooling to the server room on the third floor. Both condensing units are located on the roof of the building. The server room was significantly overcooled during the assessment and a simple adjustment of setpoint could yield energy savings.

The server room split systems are in operating condition. CU-1 casing is fading and showing slight signs of rust but the piping, electrical connection and curb appear in good shape. CU-2 shows minimal casing degradation and its components appear in good working condition as well. The indoor units AC-1/AC-2 are in working condition as well with minimal wear.

Water-to-water heat pumps provide air conditioning at each floor. The record drawings show 24 heat pumps serving the first floor, 36 serving the second floor and 31 serving the third floor. The heat pumps are a combination of Climatmaster and Friedrich branded units. The water-to-water heat pumps appear to vary in age significantly. City of SeaTac records indicate a replacement/addition of several heat pumps in 2002. In our discussion, maintenance staff reported minor leaks, compressor failure, and poor zoning causing over conditioning of spaces.

### HVAC HYDRONIC

The building is served by a condenser water loop that uses two 5-horsepower (HP) pumps (P-1/2). The two pumps are constant speed and the motor in one pump was replaced in 2018. The heat pumps use the condenser water loop which is heated and cooled by a fluid cooler (CT-1) and an electric boiler (B-1). CT-1 is located on the roof of the facility, adjacent to the mechanical penthouse and B-1 is located on the south wall of the mechanical penthouse. Miscellaneous hydronic components were present in the mechanical penthouse as well. These components are an expansion tank, pressure relief valve, strainers and a glycol feed system.

The building uses a condenser water loop to serve as heat rejection for water-to-water heat pumps. The loop is maintained at 72°F during the summer and 80°F during the winter. The condenser casing of the water pumps is worn and chipped, but appear to be in working condition given their age. One of the motors was recently replaced in 2018. We did not see signs of visible leaking near the pumps. The expansion tank, strainers, valves and glycol system piping did not show signs of leaking and appeared to be functioning as planned.

The condenser piping uses glycol as freeze protection for the system during winter conditions. A pump in the mechanical penthouse automatically injects glycol into the system to maintain concentration levels. The condenser water distribution loop is constructed of steel piping in the mechanical penthouse and PVC throughout the building.



MAU-1 on the City Hall Roof

## ASSESSMENT & RECOMMENDATIONS



The fluid cooler was installed in 2007 and appears to be in good condition. The exterior of the unit looked clean and air intakes were free of debris. The piping was insulated with an aluminum jacket covering. The aluminum jacket was in excellent condition and may have been installed recently. Based on the condition of the jacketing, we assume the piping is in good condition as well. The integral pump also appeared to be in good condition. We observed minimal exterior degradation and did not see any leaks.

The boiler appears to be in fair condition primarily because it is installed indoors. Since there are no moving parts in the electric boiler, the only components that can fail are the heating elements or the controller. As the time of assessment, both appeared to be in working condition.

A heat pump water heater (HPWH-1) located on the roof recovers heat from the exhaust stream of AHU-1. The HPWH-1's evaporator is located in series with the exhaust of AHU-1. The HPWH-1's condenser then rejects heat into the condenser loop should it drop below its temperature setpoint. The heat pump water heater casing is faded and showing beginning signs of rust. Like the fluid cooler, the unit's piping was insulated and wrapped in aluminum jacketing. The jacketing was in good condition and we assume the piping is as well. We did not observe any leaks around the unit. At the time of assessment, the unit was not operating, although AHU-2 was running.

City Hall Major HVAC Equipment											
Equipment			Original				Age				Notes
			Unit		Motor		Unit				
Equipment Tag	Location	Service	Make/Model	Model Information	Horse Power	Electrical Information	Year Installed	Age	Expected Life	Difference	
MAU-1	Roof	Building Ventilation	Trane Climate Changer 10	Belt driven supply fan with hydronic hot water coil. Motor horsepower and coil capacity unknown	Unknown	460V/3PH	1978 (approx.)	42	25	-17	
MAU-2	Roof	Building Ventilation	Trane Climate Changer 10	Belt driven supply fan with hydronic hot water coil. Motor horsepower and coil capacity unknown	Unknown	460V/3PH	1978 (approx.)	42	25	-17	
AHU-2	Roof	Building Ventilation and Exhaust	Trane Climate Changer 21	Belt driven supply and exhaust fan with hydronic hot water coil. Motor horsepower and coil capacity unknown. Hot water heat pump on exhaust stream to recovery heat to the condenser loop.	Unknown	460V/3PH	1978 (approx.)	42	25	-17	
B-1	Mechanical Penthouse	Condenser Loop	Weil-McLain CEW-128	436 MBH electric boiler	n/a	460V/3PH	2001	19	15	-4	
P-1	Mechanical Room	Condenser Loop	Armstrong 4280BF	Constant speed direct drive based mounted pump.	5	460V/3PH	1990 (approx.)	30	15	-15	
P-2	Mechanical Room	Condenser Loop	Armstrong 4280BF	Constant speed direct drive based mounted pump.	5	460V/3PH	1990 (approx.)	30	15	-15	
CT-1	Roof	Condenser Loop	Baltimore Aircoil VF1-072	Closed loop cooling tower	25	460V/3PH	2007	13	20	7	
PCT-1	Mounted to CT-1	Belt driven cooling tower circulation pump	Baltimore aircoil	Constant speed inline belt drive pump.	2	460V/3PH	2007	13	15	2	
HP-XXX	Plenum space of each floor	Comfort cooling within city hall space	Climatemaster	Various water source heat pumps.	Various	265V/1	2003	17	19	2	
HP-XXX	Plenum space of each floor	Comfort cooling within city hall space	Fredrich	Various water source heat pumps.	Various	265V/1	1990	30	19	-11	
HPWH-1	Roof in exhaust stream of AHU-2	Condenser Loop	AO Smith	Heat pump water heater used for heat recovery into condenser loop	2	240V/1PH	2010 (approx.)	10	15	5	
CU-1/AC-1	Roof	3rd Floor Server Room	York H1RC048S25G	Split system for server room cooling	N/A	208V/3Ph	2006 (approx.)	14	15	1	
CU-2/AC-2	Roof	3rd Floor Server Room	Fujitsu AQU42RLX	Split system for server room cooling	N/A	208V/3Ph	2010	10	15	5	





*Check Valve on Domestic Water Line*

## PLUMBING

The domestic water riser enters the building via the sprinkler riser room on the first floor of the building. A dual check valve assembly is located on the water line. A funnel drain below the check valve captures any discharge from the relief valve. Directly above the check valve assembly is a pressure reducing valve (PRV). During our site assessment, the pressure gauges indicated water pressure of 80 psi upstream of the PRV and 60 psi downstream. These pressures are typical for a building this size.

During our assessment, the domestic water riser, dual check valve assembly and pressure reducing valve appeared to be functioning as intended. Pressure gauges did not fluctuate significantly and the check valve assembly was not spitting water. While the components were functioning properly, the assembly and piping had minor calcification on the body of the valve and some piping.

A centralized water heater (WH-1) is located on the first floor. The water heater is a 120-gallon Rheem model with two 4500-watt heating elements within the tank. The water heating system uses a circulation pump to provide hot water quickly to fixtures. Thermostats on the hot water piping indicated a water temperature of approximately 100B degrees Fahrenheit, lower than most commercial systems. The electric water heater is functioning properly with no leaks or discharge from the relief valve. The adjacent circulation pump was making an uncharacteristic high-pitched noise that could potentially mean the pump is off balance. The expansion tank and piping are in good condition as well.

Plumbing fixtures consisted of lavatories, sinks, faucets, water closets and urinals. Lavatory and sink faucets provide 2.5 gpm of flow, water closets use 1.6 gpf and urinals use 1 gpf. The lavatories and sinks use 2 gpm more flow than modern fixtures. The water closets are in line with modern consumption while the urinals are about 0.5 gpm higher than a modern urinal. Plumbing fixtures were working properly although using almost double the water of modern fixtures. The water closets, urinals and faucets are manually operated.



*Fire Riser Assembly*

## FIRE PROTECTION

There is a wet fire protection system throughout the building. Based on occupancy type, the City Hall is most likely classified as a Light Hazard Group 1 System. The fire riser assembly is located adjacent to the domestic water riser in the fire sprinkler room.

The 4" riser is constructed of black steel piping and connected with grooved fittings and couplings. The fire protection system is regularly tested and inspected. The inspection log on the piping indicated a recent inspection in March 2020. We did not test the system, assuming it is in working condition based on the recent test. We observed minor water leakage at the base of the riser at a flanged connection. This is likely due to a worn seal between the two flanged ends. The leakage does not affect the performance of the system at this time.



### EXISTING ENVELOPE SYSTEM - ENERGY ANALYSIS ASSUMPTIONS

Original building plans from 1978 show wall details used to create the baseline building for our analysis. The walls are constructed of 8" CMU on the first floor and quarter-inch 7-foot tall glazing. An aluminum soffit extends four feet over the windows. 1-1/2" batt insulation is behind the CMU section of the walls.

This wall construction is repeated up to the third floor of the building where the aluminum overhang extends above the roof line to create a parapet. The roof is insulated with 1-1/2" rigid insulation. There is no existing information on the R-value of the insulation in the building. In order to complete a preliminary, envelope energy analysis, FSi made the following assumptions:

- Energy model will be "big box style." Exterior walls, windows, and doors will be accurately modeled but interior space type will be general office.
- Lighting will be modeled at 1.8 w/sq ft
- Miscellaneous plug loads will be modeled at 0.5 w/sq ft
- We will assume an R-value of 6.1 for the 1 1/2" of insulation. We base this value on information from the North American Insulation Manufacturers Association and the depth of the insulation.
- We have no information on the performance of the windows. We will assume window U-Values equal to the 1980 WSEC minimum  $U = 0.65$ , transmission coefficient = 0.8.

The goal of this analysis is to provide a recommendation for decreasing the energy consumption of the facility by increasing the insulation values of the walls, roofs, and windows. By increasing insulation values, the facility will save energy while reducing its peak load for mechanical equipment. Smaller mechanical equipment will lead to lower up-front cost during construction. Results are reported as a percent savings of energy over the baseline model.



## ENVELOPE ANALYSIS RESULTS

The following table summarizes construction type for each envelope insulation alternative. See Appendix for supporting documentation.

This analysis tells us the largest heat loss in the building occurs through the windows and the roof. Minimal heat loss occurs through the walls due to the thickness of the concrete. The tables on the opposite page present a clear picture as to which envelope improvements will benefit the facility the most from an energy standpoint. The existing roof has minimal insulation with a low R-value. R-value is the measure of insulation's ability to resist heat transfer. By bringing the roof up to 2018 WSEC minimum, the energy use of the building's HVAC system could be improved by 11.5% over baseline.

Existing windows have high U-values, make up a large portion of the envelope, and cause a significant amount of heat loss from the building. U-value is a measure of heating transmission through a building assembly. An assembly is defined as the entire portion of the envelope such as a window or the combination of siding, insulation, framing and interior wall boards. Our analysis shows that by improving the windows to code minimum, we see the second largest increase in energy savings over the baseline, at 8.2%. A 10% decrease in U-value also led to significant energy savings of 7.9% over Alternative 1. A negligible increase in energy savings was seen in a 20% decrease in U-value over baseline versus the 10% decrease over baseline.

Finally, we analyzed combinations of the highest performing energy conservation measures. The most significant savings comes from improving the roof and windows to code-minimum values, consistent with our observations in the previous tables. We found that improving the insulation of the walls does little to improve the energy performance of the facility. This is due to the existing concrete walls providing excellent thermal mass for the facility and the existing continuous insulation behind the walls.

*Wall and Roof Results Table*

	<b>Baseline Existing Envelope</b>	<b>Alt-1 Wall Improvement</b>	<b>Alt-2 Roof Improvement</b>	<b>Alt-3 Wall and Window Improvement Combination</b>
<b>Wall Construction</b>	8" CMU with 1.5" continuous insulation	8" CMU with R9.5 continuous insulation	Equal to baseline	8" CMU with R9.5 continuous insulation
<b>Wall U-Value</b>	0.14	0.104*	0.14	0.104*
<b>Roof Construction Type</b>	1.5" continuous insulation above deck	Equal to baseline	R-38 continuous insulation above deck	R-38 continuous insulation above deck
<b>Roof U-Value</b>	0.17	0.17	0.027*	0.027*
<b>Percent Savings Over Baseline (kWh/Yr)</b>	N/A	1.27%	11.5%	12.7%

\*Values marked with an asterisk meet 2018 WSEC minimum performance requirements.

Window Results Table

	Baseline Existing Envelope	Alternative 1	Alternative 2	Alternative 3
<b>Window U-Value</b>	0.65	0.38*	0.34***	0.30***
<b>Percent Savings Over Baseline (kWh/Yr)</b>	N/A	8.2%	14.1%	15.3%

Combination Table

Note: Alternate 2 on the combination table is a full envelope upgrade to the WSEC.

	Baseline Existing Envelope	Alt-1 Roof and Window Improvement Combination	Alt-2 Wall, Roof and Window Improvement Combination	Alt-3 Wall, Roof and Increased Window Improvement Combination
<b>Wall Construction</b>	8" CMU with 1.5" continuous insulation	Equal to baseline	8" CMU with R9.5 continuous insulation	8" CMU with R9.5 continuous insulation
<b>Wall U-Value</b>	0.14	0.14	0.104*	0.104*
<b>Roof Construction Type</b>	1.5" continuous insulation above deck	R-38 continuous insulation above deck	R-38 continuous insulation above deck	R-38 continuous insulation above deck
<b>Roof U-Value</b>	0.17	0.027*	0.027*	0.027*
<b>Window U-Value</b>	0.65	0.38*	0.38*	0.34****
<b>Percent Savings Over Baseline (KWh/Yr)</b>	N/A	18.9%	20%	20.8%

We recommend replacing the windows and insulating the roof to WSEC minimum to maximize energy savings of the facility. Not only will this save on longer term cost, it has the potential to reduce the cost of the WSHP replacement.

By improving the envelope of the facility, peak HVAC load on the system can be reduced, allowing for the design of smaller heat pumps with lower up front equipment costs.

\*Values marked with an asterisk meet 2018 WSEC minimum performance requirements.

\*\*\* Indicates better performance than 2018 WSEC minimum requirements.





# MECHANICAL RECOMMENDATIONS

## FACILITY IMPROVEMENT MEASURES (FIMs)

FSi recommends the following facility improvement measures (FIMs) to meet the 40-year facility improvement goal. The FIMs are based on information provided by the City of SeaTac and observations during our site walk of the City Hall. Please note that almost no mechanical equipment has an expected 40-year life span, so over the next 40 years, it is likely that some FIMs listed below will need to occur twice. Recommendations are listed in order of priority.

### HVAC FIMs

- M1: Replace Make Up Air Units and Air Handler
- M2: Replace Existing Ductwork
- M3: Replace & Rezone Water Source Heat Pumps
- M4: Replace Condenser Loop Pumps and Install Variable Speed Drives
- M5: Replace Electric Boiler
- M6: Replace Server Room Split Systems with a Single System
- M7: Refurbish Fluid Cooler in 7-10 Years, Replace in 15-20 Years

#### M1: Replace Make Up Air Units and Air Handler

The existing MAUs and AHU have exceeded their expected service life by over 20 years. Periodic maintenance has kept this equipment functional but the equipment remains far less energy efficient and reliable than modern day air handling units. FSi recommends replacing all units with new MAUs that have electric heating coils and heat recovery.

The supply and exhaust fans of modern MAUs have variable speed drives enabling the fan speed to be slowed during periods of low demand. This will save energy and increase the lifespan of the fans. The heat recovery system within the new MAUs will allow supply air to be tempered by the exhaust air in the existing space. The airstreams will cross in a heat exchanger, pre-conditioning supply air, which reduces the required heating or cooling of the supply air. We recommend a fixed plate heat exchanger that has no moving parts for energy recovery. Although slightly less efficient than a heat recovery wheel, it requires no power or maintenance other than occasional washdown. We also recommend the MAUs be installed on their own roof curbs that keep all ducting internal to the unit. Exterior ductwork can corrode and rust quickly, leading to potential leaks and moisture issues within the building. Integral ducting eliminates this problem as long as the roof curb is sealed properly when installed.

#### M2: Replace Existing Ductwork

It is difficult to determine the exact routing of the duct system due to the lack of record drawings showing ventilation ductwork. Given the age of the ventilation system, we assume the duct is approximately 40 years old. This FIM proposes to provide new ductwork with the replacement of the make-up air units and air handlers.

Typical ventilation systems during 1970s dumped ventilation air directly into the plenum where the water source heat pumps are located. This type of design minimized the amount of duct and diffusers required but led to extremely poor ventilation in areas that are located further away from the outside air duct. New ductwork will route ventilation air directly to each occupied space, which will lead to healthier indoor air quality and thermal mixing within the space.

### M3: Replace and Rezone Water Source Heat Pumps

The water source heat pumps throughout the facility are either Fredrich or Climatemaster models. Fredrich stopped making water source heat pumps in the late 1980s, which indicates that all Fredrich units in this facility are at least 30 years old and past their expected service life by 11 years. Based on serial numbers, we assume the Climatemaster units throughout the facility are between 15 and 20 years old and are approaching the end of their expected service life. With this FIM, we recommend replacing all Fredrich heat pumps in Year 1 and replacing the remaining heat pumps in 5 years.

Procuring replacement parts for units more than 15 years old is extremely difficult if not impossible. The most problematic replacement will be refrigerant. These units use R-22 which has been phased out of use since 2010. This refrigerant has an extremely high global warming and ozone depletion potential. Should a major repair be needed in a unit, it will likely result in an entire replacement of the heat pump.

We recommend rezoning the system when the heat pumps are replaced. We understand occupants complain that spaces throughout the facility are either too hot or too cold. This is due to a single heat pump heating/cooling multiple zones. This issue can be easily resolved by providing new or relocating thermostats and rerouting ductwork from new units to individual zones. Included in this FIM is a unit-mounted controller and wiring to the existing control system.

### M4: Replace Condenser Loop Pumps and Install Variable Speed Drives

The condenser loop pumps have exceeded their expected service life by approximately 15 years. Although one pump recently had a motor replaced, impellor and other pump components are most likely 30 years. This FIM proposes replacing the pumps and providing variable speed drives on the pump motors. An alternative to this FIM would replace one pump and install VFDs on both pumps. Since one motor was recently replaced on the pumps, we do not feel both pumps need to be replaced at this time.

Modern pumps are more efficient than the pumps currently installed. The replacement pumps will be selected at the most efficient point given the actual data on the condenser loop's flow and pressure. When pumps are selected based on design conditions, they can often be oversized and waste energy. Equipping the motors with VFDs will allow the pumps to modulate during part-load conditions. This reduces energy costs and increases pump life span.

### M5: Replace Electric Boiler

The boiler has exceeded its expected service life by 4 years. The boiler appeared to be operating at the time of assessment, but with its age, failures in the upcoming years are likely, and could happen without notice. The electric infrastructure is already in place at this facility, which is generally the costliest part of installing an electric boiler. A replacement boiler would be relatively simple and increase the reliability of the HVAC system.

### M6: Replace Server Room Split Systems with a Single System

The split systems have not reached the end of their expected service life, but are approaching an age where failures can be expected. Split system units are relatively inexpensive and by using a single, larger unit., server room floor space could be opened for future expansion. CU-1/AC-1 utilizes R-22 refrigerant like the water-to-water heat pumps described previously. For the same reasons, we recommend replacement of the system.

### M7: Refurbish Fluid Cooler in 7-10 Years, Replace in 15-20

The existing fluid cooler is in good working condition and has 7 years on its expected life remaining. With simple preventative maintenance, the life of the fluid cooler could be extended beyond that. Refurbishment would replace pumps, fans, and motors of the equipment. This FIM proposes replacing components as the fluid cooler ages, with a full replacement in the next 15-20 years.



### PLUMBING FIMs

- P1: Replace Lavatory and Sink Faucets
- P2: Replace Water Closets and Flush Valves
- P3: Replace Existing Shower Heads
- P4: Increase Water Heating Temperature to 140°F
- P5: Replace Water Heater and Circulation Pump

#### P1: Replace Lavatory and Sink Faucets

The existing fixtures are functioning properly, but use much more water than modern fixtures. This FIM proposes replacing lavatory and sink faucets with low-flow fixtures to reduce utility costs. According to the most recent record documents, some lavatory and kitchen faucets on the first and third floor were replaced in 2002. The flow rates for those fixtures are 2.5 gpm, well above a modern low-flow fixture. We recommend replacing lavatory faucets with metered, touchless 0.5 gpm faucets to reduce both water use and energy used to heat water. Kitchen faucets require a higher flow rate and would be replaced with 1.5 gpm faucets.

#### P2: Replace Water Closets and Flush Valves

This FIM proposes replacing older water closets with modern flush valves. Water closets older than 2002 had high flush rates around 3.0 gpf. We recommend replacing these water closets and flush valves with 1.6 gpf units, reducing water cost of the facility. The record drawings show some of the existing water closets were replaced after 2002 and have 1.6 gpm flush valves. Those can remain in place.

#### P3: Replace Existing Shower Heads

A few showers exist throughout the facility and while they make up a small percent of the plumbing fixtures, they have the potential to account for a large portion of the facility water use. The existing shower heads have flow rates of 2.5 gpm. This FIM proposes replacing these shower heads with 1.5 gpm heads. This will reduce both the domestic water and heating water load on the facility.

#### P4: Increase Water Heating Temperature to 140°F

During our site assessment, temperature sensors on the domestic hot water indicated a temperature of 104°F. This FIM proposes increasing the water temperature to 140°F and providing mixing valves at lavatories to temper water temperature down to 100°F. Even though the system has a circulation pump, storing water at temperatures lower than 120°F can allow legionella bacteria to grow within the water system. Modern standard practice in water systems is to store water at temperatures above 140°F, then mix down to 100°F at hot water fixtures.

#### P5: Replace Water Heater and Circulation Pump

Based on existing drawings the water heater and circulation pump were installed in 2002. Both appear in good working condition and have 2-4 years of expected service life remaining. Although the pump was making a high-pitched noise during our assessment, the pump could likely be fixed with simple maintenance. The performance of the pump did not seem to be affected and the system held a constant pressure during observation. With the age of the system, it is likely that components of the hot water system will begin to fail in the next 5 years, after which we recommend a full replacement of the water heater and pump.

## PHASING OF RECOMMENDED FIMs

DESCRIPTION	Year(s)	2021	2025	2030	2036	2040	2041	2045	2046	2051	2055	2059	2060
M1: Replace Make Up Air Units and Air Handler	2021, 2046	230							377				
M2: Replace Existing Ductwork	2021, 2060	150											325
M3: Replace Water Source Heat Pumps and Rezone	2021, 2026, 2055	560	238			1163							1694
M4: Replace Condenser Loop Pumps and Install Variable Speed Drives	2021, 2041	20					30						
M5: Replace Electric Boiler	2021, 2036, 2051	30			40					54			
M6: Replace Server Room Split Systems	2021, 2041	40			54					72			
M7: Refurbish Fluid Cooler in 7-10 years, Replace in 15-20	2030, 2045			60				161					
P1: Replace Lavatory and Sink Faucets	2021	40											
P2: Replace Water Closet and Flush Valves	2021	40											
P3: Replace Existing Shower Heads	2021												
P4: Increase Water Heating Temperature to 140°F	2021												
P5: Replace Water Heater and Circulation Pump	2025, 2040, 2055		12			15					20		
NOTE - YEARS THAT HAVE NO FIMs ARE OMITTED FROM THE TABLE	COST (THOUSANDS)	1110	250	60	94	1177	30	161	377	127	20	1694	325
NOTE - COST ESCALATION IS BASED ON 2% INCREASE/YEAR													

## FIRE PROTECTION FIM

F1: Replace Sprinkler Head

### F1: Replace Sprinkler Head

NFPA 25 recommends sprinkler head replacement after 50 years with regular testing intervals of 10 years. This FIM concurs with NFPAs recommendation to increase the lifespan of the fire protection system.

## ENVELOPE RECOMMENDATIONS

FSi recommends replacing the windows and insulating the roof to WSEC-minimum requirements in order to maximize energy savings of the facility. Not only will this save on longer term cost, it has the potential to reduce the cost of the WSHP replacement. By improving the envelope of the facility, the peak HVAC load on the system can be reduced. Reducing the peak load will allow for the design of smaller heat pumps with lower upfront equipment costs.





## MECHANICAL IMPROVEMENTS TO ARCHITECTURAL RECOMMENDATIONS

Based on the recommended design option by ARC Architects, FSi performed a preliminary mechanical design and cost analysis for the requirements of a single-story addition to the building.

### *HVAC Requirements*

The building addition must fully comply with the 2018 WSEC. This means buildings systems will be pushed to using heat pump based systems rather than gas. Using an approximate heating and cooling requirement of 25 btu/sqft the addition would have a 25-ton load. For purposes of estimating cost/sqft of the addition we assume a stand-alone system not connected to the existing city hall HVAC system. This could be a variable refrigerant flow system (VRF) or air to water heat pump.

### *Plumbing Requirements*

The existing drawings indicate the sanitary main exits the City Hall toward Orilla Road, just south of the lobby. This could prove to be a challenge, given the addition is on the opposite side of the site from the sewer connection. The sanitary invert could be too high to connect to the existing main. To mitigate this, a new sanitary connection could be established to a sanitary main.

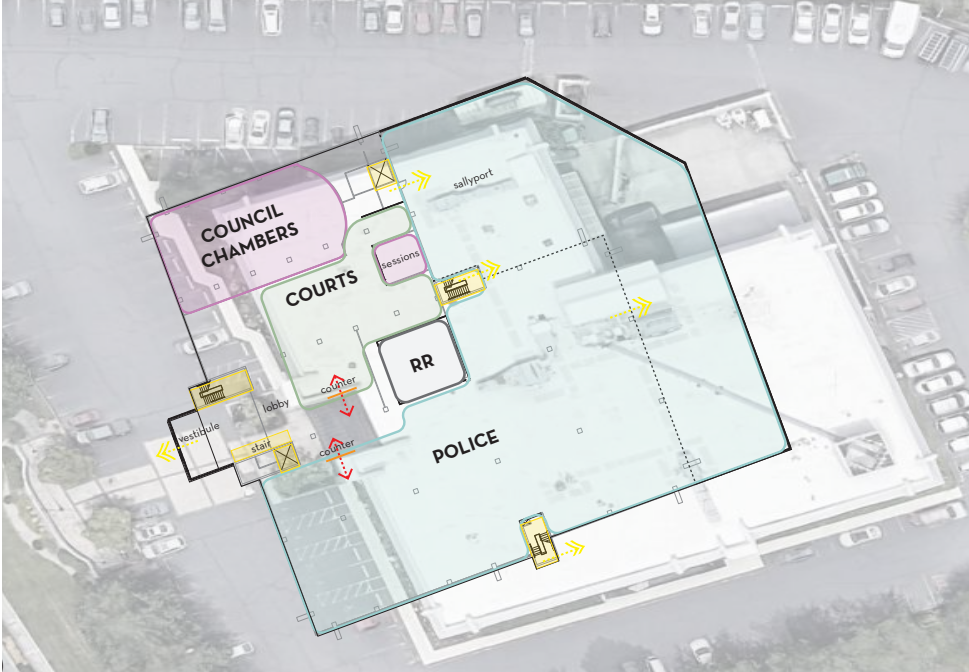
### *Fire Protection Requirements*

Given the size of the existing main, we believe that the existing fire protection system can be extended to cover the addition. The police addition would most likely fall under a light hazard group 1 classification, matching the existing facility.

### *Preliminary Cost per Square Foot of Addition*

With the assumptions listed above, we have developed a rough cost breakdown of the mechanical system as follows:

	<b>HVAC</b>	<b>Plumbing</b>	<b>Fire Protection</b>	<b>Total</b>
<b>Cost (\$/sqft)</b>	45	30	5	80



# EXECUTIVE SUMMARY

## ASSESSMENT & RECOMMENDATIONS

### **CONCEPT OPTIONS**

#### COST ANALYSIS

#### APPENDIX

## OVERVIEW

After developing the departmental space planning and adjacencies exercise with the directors of each department, ARC Architects explored a variety of options for the City to consider in redeveloping the existing building to accommodate the City's projected growth. The following pages illustrate site and floor plan configurations for (4) options that are sized to meet the demands of the City at a population size of 40,000. Per the US Census Bureau, the City of SeaTac had a population of approximately 29,000 in the 2019.

The four options are ranked in order from the most minimal work and, therefore, least expensive, to the most comprehensive and expensive option. Options A and B do not include a building addition whereas Options C and D include new construction. Advantages and disadvantages of each option are listed in further detail in addition to departmental sizes, which are based on the space planning worksheets developed by Beckwith Consulting Group.

ARC Architects recommends Option D, the most comprehensive approach to redeveloping the existing City Hall building. This option is described in further detail within the Architectural Recommendations section of this report. It is also the basis for the Cost Analysis section of this report.

*Opposite: Option D, First floor plan embedded within the existing site.*

*Below: Schematic rendering of the second floor lobby, with large, open spaces connecting to the first and third floors.*



## OPTION A

### PROs

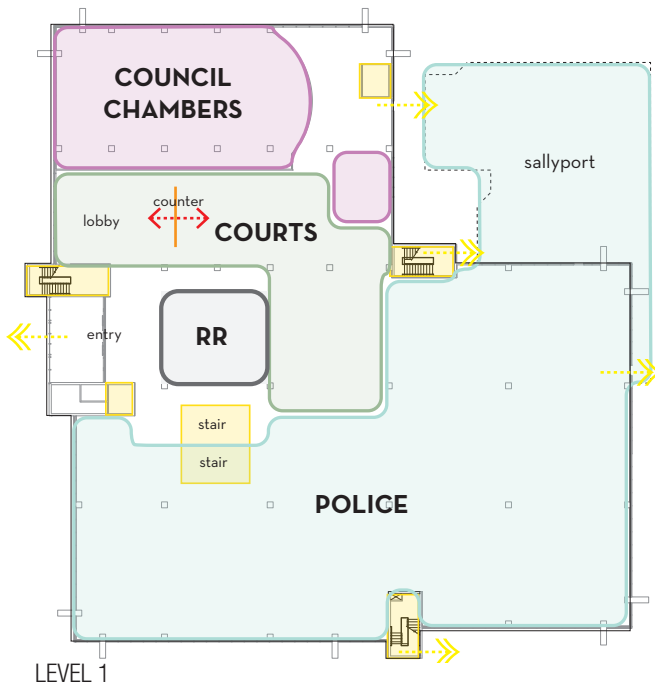
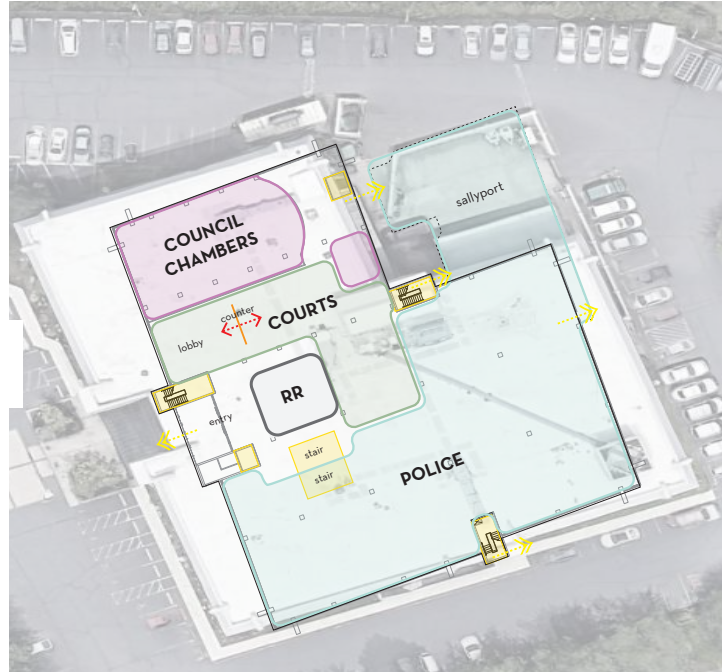


- Lowest construction cost (\$)
- Maintains existing building footprint
- Police remain at City Hall
- No phasing required (re: restrooms)
- Parks and City Manager are oversized by >500 sf



### CONS

- Combines Council Chambers and Courtroom
- Existing lobby size remains the same
- Police distributed across two floors
- Courts Counter is de facto welcoming reception
- CED and Finances located on separate floors
- Third floor Conference Center not easily accessible to the public

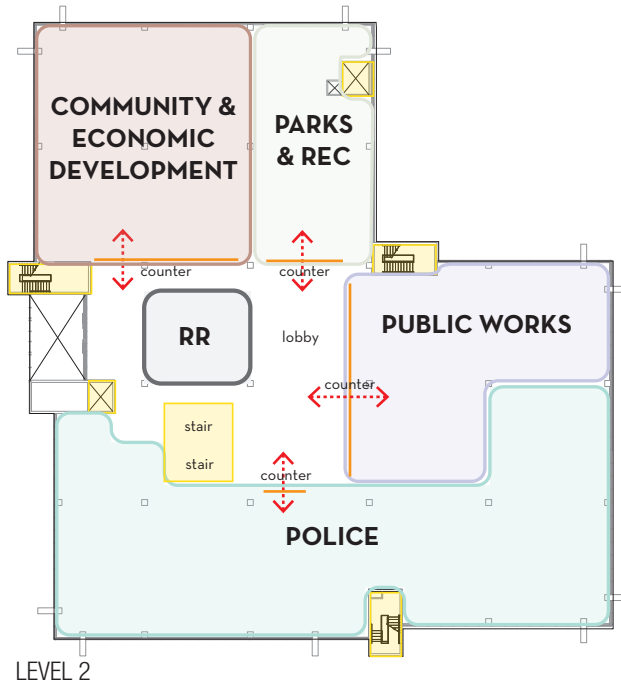


## OPTION NAME **A**

DEPARTMENTAL AREA - FIRST FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
ELEV	CIRCULATION	77 SF
WEST STAIR	CIRCULATION	203 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION: 5		660 SF
WOMENS RR	COMMON	265 SF
MENS RR	COMMON	262 SF
ELEC	COMMON	40 SF
RISER	COMMON	105 SF
JANITOR	COMMON	46 SF
ELEC	COMMON	88 SF
RR	COMMON	79 SF
STOR	COMMON	105 SF
VESTIBULE	COMMON	428 SF
ELECTRICAL	COMMON	314 SF
STOR	COMMON	88 SF
LOBBY	COMMON	2707 SF
COMMON: 12		4525 SF
SESSIONS	COUNCIL CHAMBERS	415 SF
COUNCIL CHAMBERS	COUNCIL CHAMBERS	3131 SF
COUNCIL CHAMBERS: 2		3546 SF
CONF	COURTS	272 SF
COURTS	COURTS	3067 SF
COURTS: 2		3339 SF
SALLYPORT	POLICE	3790 SF
POLICE	POLICE	13767 SF
POLICE: 2		17558 SF
Grand total: 23		29628 SF

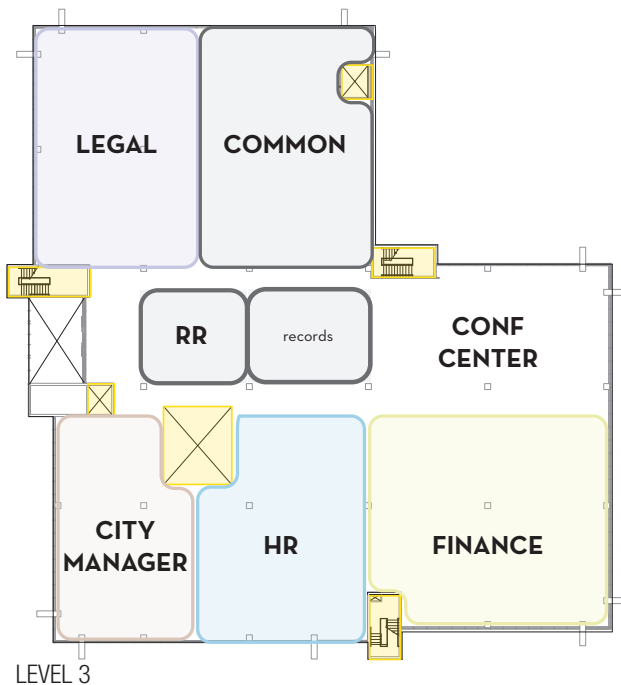


# OPTION NAME A



DEPARTMENTAL AREA - SECOND FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	77 SF
NORTH STAIR	CIRCULATION	203 SF
ELEV	CIRCULATION	64 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
NEW STAIRS	CIRCULATION	479 SF
CIRCULATION: 6		1139 SF
LOBBY	COMMON	3539 SF
WOMENS RR	COMMON	265 SF
MENS RR	COMMON	262 SF
ELEC	COMMON	88 SF
JAN	COMMON	46 SF
COMMON: 5		4199 SF
COMMUNITY & ECONOMIC DEVELOPMENT	COMMUNITY & ECONOMIC DEVELOPMENT	4637 SF
COMMUNITY & ECONOMIC DEVELOPMENT: 1		4637 SF
PARKS & REC	PARKS	2523 SF
PARKS: 1		2523 SF
POLICE	POLICE	9044 SF
POLICE: 1		9044 SF
PUBLIC WORKS	TENANT	4105 SF
TENANT: 1		4105 SF
Grand total: 15		25647 SF

# OPTION NAME A



DEPARTMENTAL AREA - THIRD FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
EAST STAIRS	CIRCULATION	158 SF
NORTH STAIRS	CIRCULATION	203 SF
ELEV	CIRCULATION	77 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION: 6		2190 SF
CITY MANAGER	CITY MANAGER	2849 SF
CITY MANAGER: 1		2881 SF
LOBBY	COMMON	697 SF
WOMENS RR	COMMON	265 SF
STOR	COMMON	149 SF
MENS RR	COMMON	262 SF
ELEC	COMMON	88 SF
JAN	COMMON	46 SF
RECORDS	COMMON	1002 SF
CONFERENCE CENTER	COMMON	2009 SF
BREAK ROOM	COMMON	997 SF
LOCKERS	COMMON	637 SF
CONFERENCE CENTER	COMMON	2387 SF
COMMON: 11		8537 SF
FINANCE	FINANCE	4485 SF
FINANCE: 1		4485 SF
HUMAN RESOURCES	HUMAN RESOURCES	3509 SF
HUMAN RESOURCES: 1		3509 SF
LEGAL	LEGAL	3497 SF
LEGAL: 1		3497 SF
Grand total: 21		25758 SF

## OPTION B

### PROs

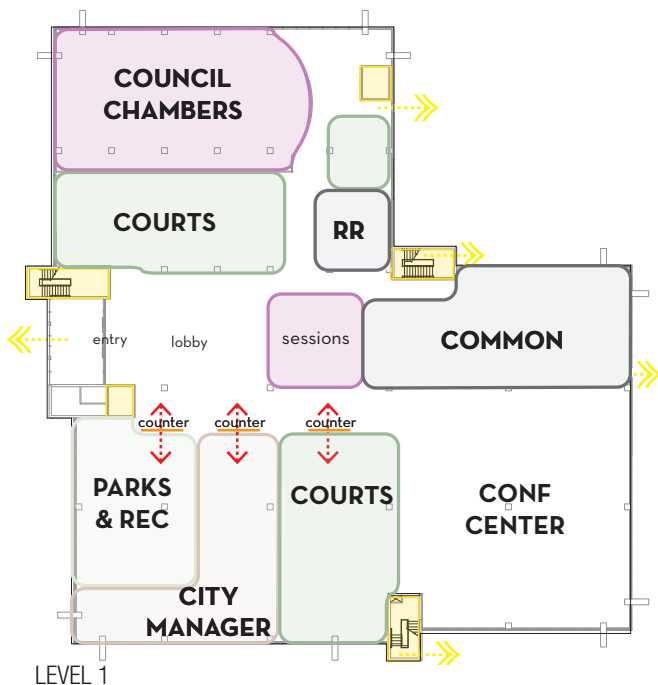
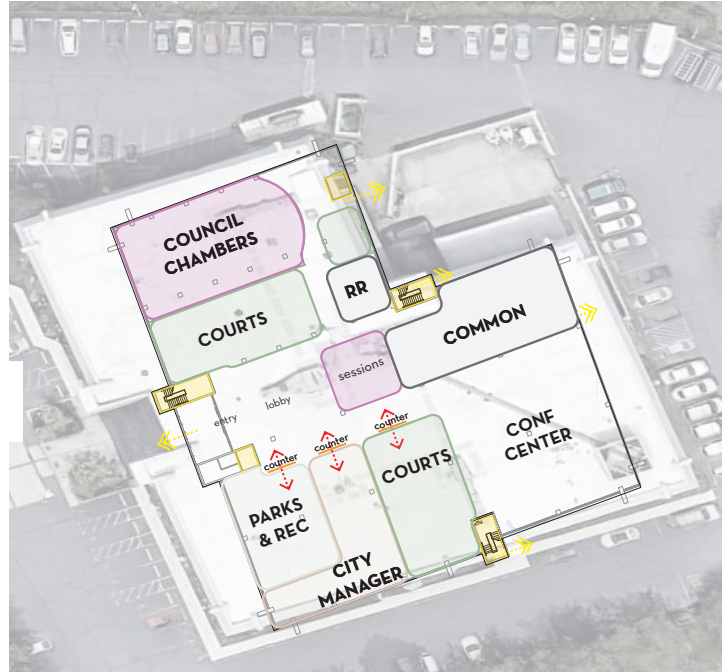


- Low construction cost (\$\$)
- Maintains existing building footprint
- Maintains Council Chambers and Courtroom
- Enlarged lobby
- First floor Conference Center easily accessible to the public
- Entire third floor is rentable



### CONS

- Police relocated off-site
- Phasing required to accommodate new restrooms
- Sessions central locale may not be preferable
- Parks and Public Works located on separate floors
- Some departments spread across 1+ areas

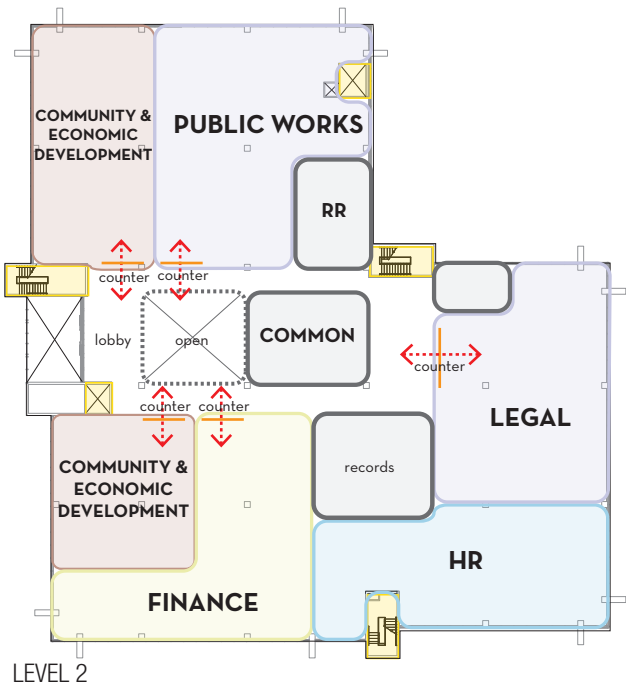


LEVEL 1

## OPTION NAME B

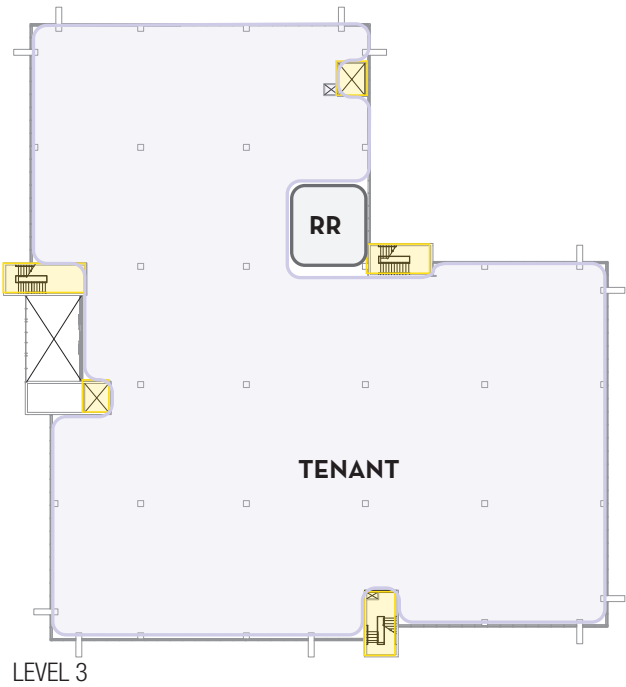
DEPARTMENTAL AREA - FIRST FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
ELEV	CIRCULATION	77 SF
WEST STAIR	CIRCULATION	203 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION: 6	CIRCULATION	2642 SF
CIRCULATION: 6		3302 SF
CITY MANAGER: 1	CITY MANAGER	2174 SF
CITY MANAGER: 1		2174 SF
ELEC	COMMON	40 SF
RISER	COMMON	105 SF
RR	COMMON	254 SF
VESTIBULE	COMMON	428 SF
ELECTRICAL	COMMON	314 SF
STOR	COMMON	88 SF
JAN	COMMON	45 SF
RR	COMMON	218 SF
LOBBY	COMMON	2297 SF
ELEC	COMMON	212 SF
BREAK	COMMON	1610 SF
LOCKERS	COMMON	226 SF
LOCKERS	COMMON	245 SF
CONFERENCE CENTER	COMMON	3986 SF
COMMON: 14		10066 SF
COUNCIL CHAMBERS	COUNCIL CHAMBERS	3131 SF
SESSIONS	COUNCIL CHAMBERS	794 SF
COUNCIL CHAMBERS: 2		3925 SF
COURT ROOM	COURTS	1234 SF
RR	COURTS	91 SF
LOBBY	COURTS	472 SF
OFFICE	COURTS	115 SF
JURY	COURTS	417 SF
OFFICE	COURTS	164 SF
COURT ADMIN	COURTS	2174 SF
COURTS: 7		4667 SF
PARKS: 7		1768 SF
PARKS: 1	PARKS	1768 SF
Grand total: 31		25902 SF

OPTION NAME **B**



DEPARTMENTAL AREA - SECOND FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	77 SF
NORTH STAIR	CIRCULATION	203 SF
ELEV	CIRCULATION	64 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION: 5		660 SF
RR	COMMON	255 SF
ELEC	COMMON	212 SF
MUD	COMMON	198 SF
CONF	COMMON	393 SF
CONF	COMMON	392 SF
RECORDS	COMMON	1164 SF
CONF	COMMON	343 SF
RR	COMMON	218 SF
JAN	COMMON	45 SF
LOBBY	COMMON	491 SF
COMMON: 10		3711 SF
BUILDING & ECONOMIC DEVELOPMENT	COMMUNITY & ECONOMIC DEVELOPMENT	2001 SF
PLANNING	COMMUNITY & ECONOMIC DEVELOPMENT	2647 SF
COMMON: 10		3711 SF
COMMUNITY & ECONOMIC DEVELOPMENT: 2		4647 SF
FINANCE	FINANCE	3276 SF
FINANCE: 1		3276 SF
HUMAN RESOURCES	HUMAN RESOURCES	3023 SF
HUMAN RESOURCES: 1		3023 SF
LEGAL	LEGAL	3417 SF
LEGAL: 1		3417 SF
PUBLIC WORKS	PUBLIC WORKS	3800 SF
PUBLIC WORKS: 1		3800 SF
Grand total: 21		22534 SF

OPTION NAME **B**



DEPARTMENTAL AREA - THIRD FLOOR		
NAME	DEPARTMENT	AREA
SOUTH STAIRS	CIRCULATION	159 SF
ELEV	CIRCULATION	64 SF
EAST STAIRS	CIRCULATION	158 SF
NORTH STAIRS	CIRCULATION	203 SF
ELEV	CIRCULATION	77 SF
CIRCULATION: 5		660 SF
ELEC	COMMON	212 SF
RR	COMMON	218 SF
RR	COMMON	255 SF
JAN	COMMON	45 SF
COMMON: 4		729 SF
TENANT	TENANT	24271 SF
TENANT	TENANT	149 SF
TENANT: 2		24420 SF
Grand total: 11		25809 SF

## OPTION C

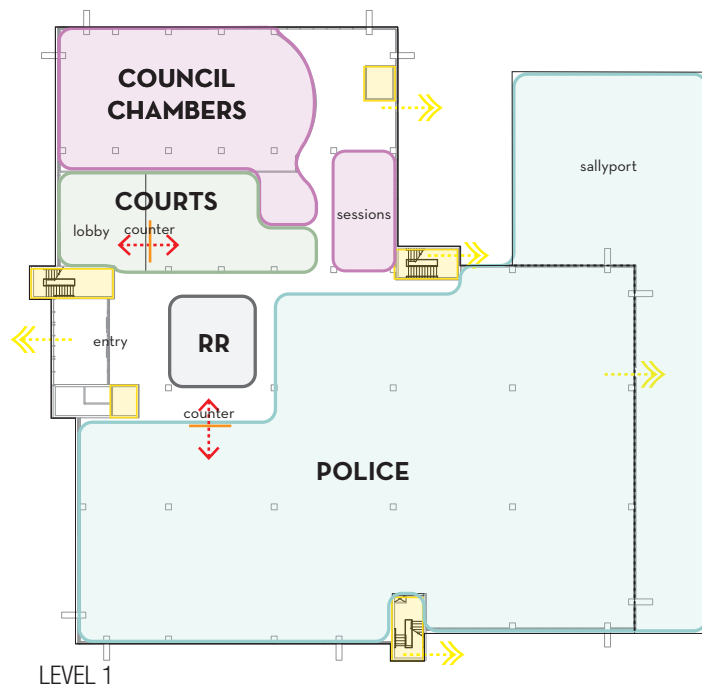
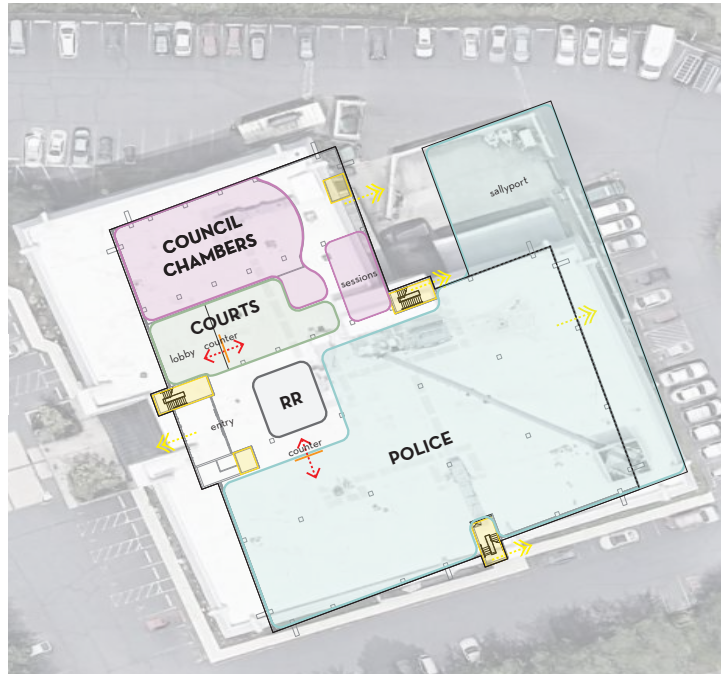
### PROs

- Police remain at City Hall
- Police located on a single floor
- No phasing required (re: restrooms)
- Available tenant space on third floor
- Green roof
- CED and Public Works are oversized by >500 sf



### CONS

- Building footprint is enlarged by 5,800 sf
- High construction cost (\$\$\$)
- Combines Council Chambers and Courtroom
- Existing lobby size remains the same
- Finance and HR located on separate floors
- Courts distributed across two floors
- Parking lot requires re-configuration
- Police sized to meet ~35k population size



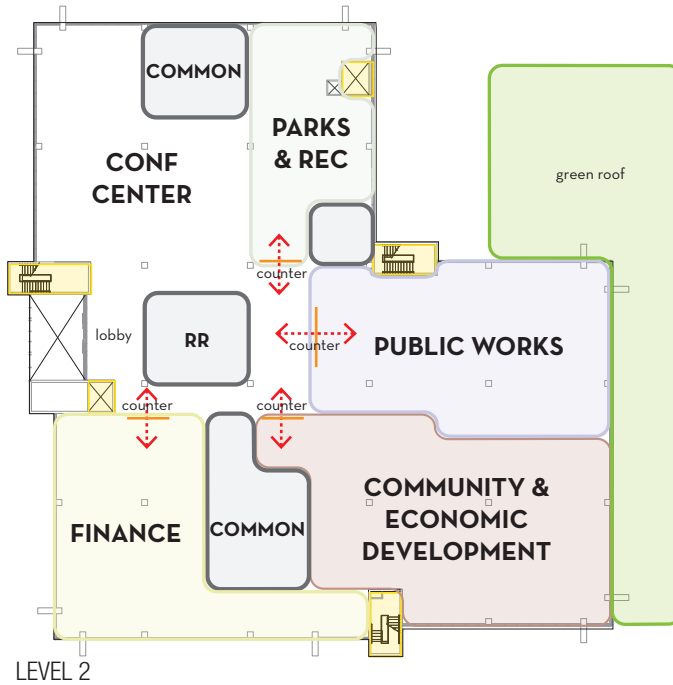
## OPTION NAME **C**

DEPARTMENTAL AREA - FIRST FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
ELEV	CIRCULATION	77 SF
WEST STAIR	CIRCULATION	203 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION	CIRCULATION	1386 SF
CIRCULATION: 6		2046 SF
WOMENS RR	COMMON	265 SF
MENS RR	COMMON	262 SF
ELEC	COMMON	40 SF
RISER	COMMON	105 SF
JANITOR	COMMON	46 SF
ELEC	COMMON	88 SF
VESTIBULE	COMMON	428 SF
ELECTRICAL	COMMON	314 SF
STOR	COMMON	88 SF
LOBBY	COMMON	705 SF
LOADING DOCK	COMMON	231 SF
STORAGE		
COMMON: 11		2570 SF
SESSIONS	COUNCIL CHAMBERS	674 SF
COUNCIL CHAMBERS/ COURT ROOM	COUNCIL CHAMBERS	3387 SF
COUNCIL CHAMBERS: 2		4060 SF
RR	COURTS	79 SF
COURT ADMIN	COURTS	1013 SF
LOBBY	COURTS	750 SF
JURY ROOM	COURTS	230 SF
COURTS: 4		2072 SF
SALLYPORT/VEHICLE STORAGE	POLICE	3759 SF
POLICE ADMIN	POLICE	3660 SF
EVIDENCE/ WEAPONS/ EQUIPMENT/ PROCESSING/ HOLDING	POLICE	2927 SF
CHIEF	POLICE	1103 SF
PATROL OPERATIONS	POLICE	1088 SF
REPORT WRITING	POLICE	1037 SF
BREAK ROOM	POLICE	573 SF
ROLL CALL/BRIEFING	POLICE	1164 SF
INVESTIGATIONS/ DETECTIVES	POLICE	1637 SF
LOCKER FACILITIES	POLICE	3805 SF
POLICE: 10		20754 SF
Grand total: 33		31503 SF

arc

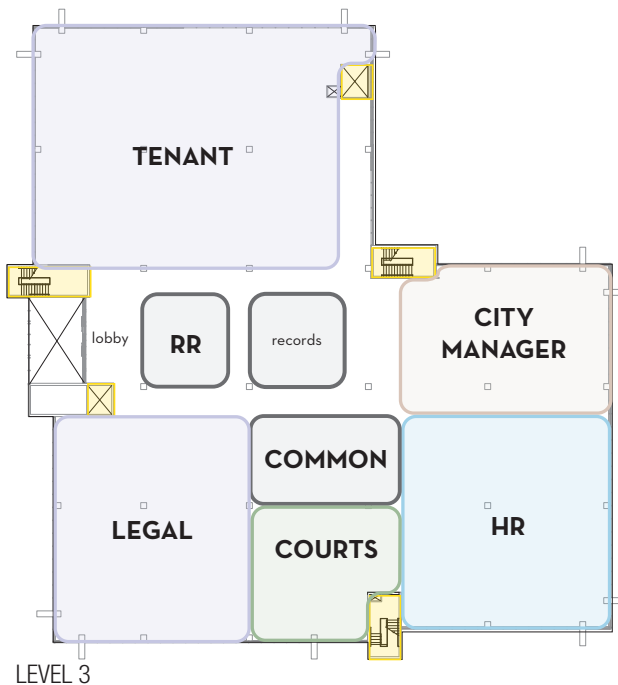


## OPTION NAME



DEPARTMENTAL AREA - SECOND FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	77 SF
NORTH STAIR	CIRCULATION	203 SF
ELEV	CIRCULATION	64 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION	CIRCULATION	688 SF
CIRCULATION: 6		1348 SF
WOMENS RR	COMMON	265 SF
MENS RR	COMMON	262 SF
ELEC	COMMON	88 SF
JAN	COMMON	46 SF
OPEN WORK AREA	COMMON	2348 SF
CONF	COMMON	559 SF
CONF	COMMON	559 SF
BREAK ROOM	COMMON	1155 SF
CONF	COMMON	244 SF
CONF	COMMON	335 SF
RECORDS	COMMON	1125 SF
WAITING AREA	COMMON	786 SF
LOBBY	COMMON	683 SF
COMMON: 13		8453 SF
CED	COMMUNITY & ECONOMIC DEVELOPMENT	5352 SF
COMMUNITY & ECONOMIC DEVELOPMENT: 1		5352 SF
FINANCE & SYSTEMS	FINANCE	3739 SF
FINANCE: 1		3739 SF
GREEN ROOF	OUTDOOR	5569 SF
OUTDOOR: 1		5569 SF
PARKS	PARKS	2185 SF
PARKS: 1		2185 SF
PUBLIC WORKS	PUBLIC WORKS	4375 SF
PUBLIC WORKS: 1		4375 SF
Grand total: 24		31021 SF

## OPTION NAME



DEPARTMENTAL AREA - THIRD FLOOR		
NAME	DEPARTMENT	AREA
SOUTH STAIRS	CIRCULATION	159 SF
ELEV	CIRCULATION	64 SF
EAST STAIRS	CIRCULATION	158 SF
NORTH STAIRS	CIRCULATION	203 SF
ELEV	CIRCULATION	77 SF
CIRCULATION	CIRCULATION	2297 SF
CIRCULATION: 6		2957 SF
CITY MANAGER	CITY MANAGER	2792 SF
CITY MANAGER: 1		2792 SF
WOMENS RR	COMMON	265 SF
STOR	COMMON	149 SF
MENS RR	COMMON	262 SF
ELEC	COMMON	88 SF
CONF	COMMON	733 SF
CONF	COMMON	476 SF
LOCKERS	COMMON	784 SF
LOBBY	COMMON	679 SF
COMMON: 8		3435 SF
COURT ADMIN	COURTS	1694 SF
COURTS: 1		1694 SF
HUMAN RESOURCES	HUMAN RESOURCES	4005 SF
HUMAN RESOURCES: 1		4005 SF
LEGAL	LEGAL	3958 SF
LEGAL: 1		3958 SF
TENANT	TENANT	6747 SF
TENANT: 1		6747 SF
Grand total: 19		25586 SF

## RECOMMENDED OPTION: OPTION D

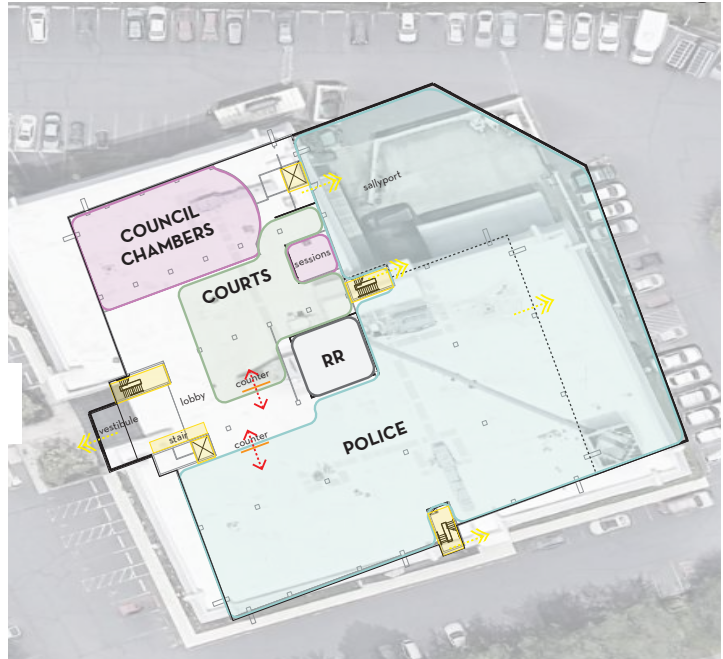
### PROs

- Maintains Council Chambers and Courtroom
- Enlarged lobby
- 10,000 sf Green roof and covered outdoor space
- Police remain at City Hall
- Double height Lobby enables enhanced wayfinding

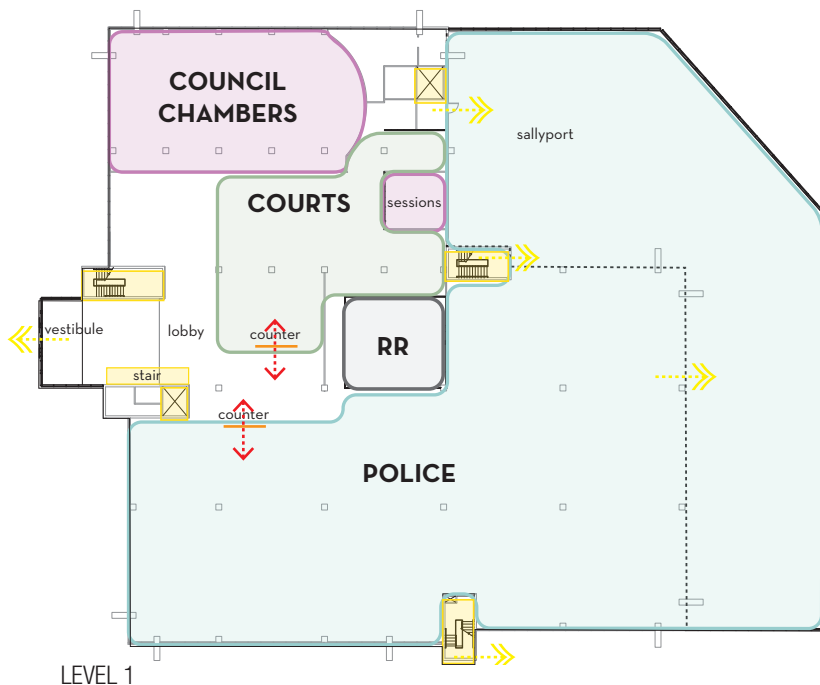


### CONS

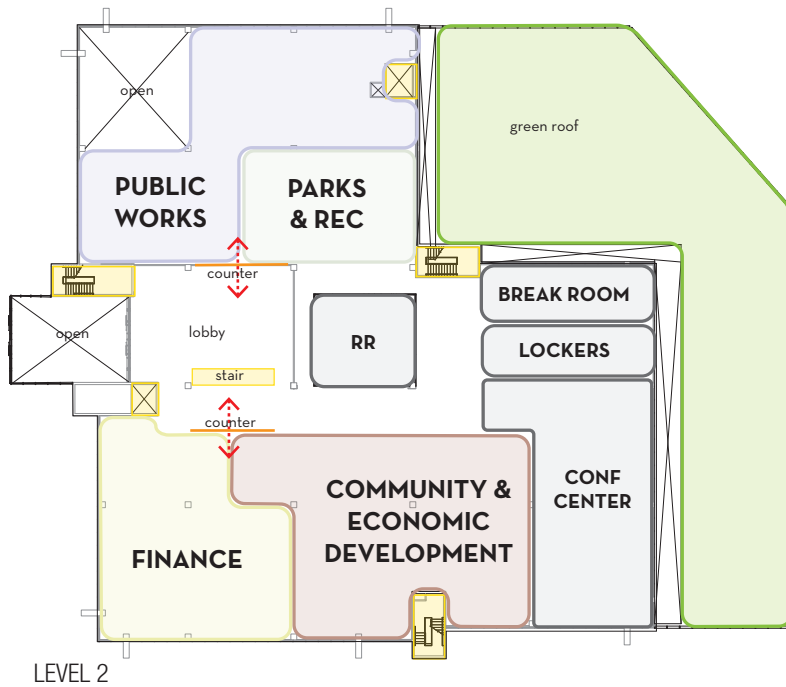
- Enlarged building footprint by 11,280 sf
- Requires offsite parking
- Highest construction cost (\$\$\$\$)
- Rentable space limited to 3,400 sf
- Phasing required to accommodate new restrooms



## OPTION NAME **D**

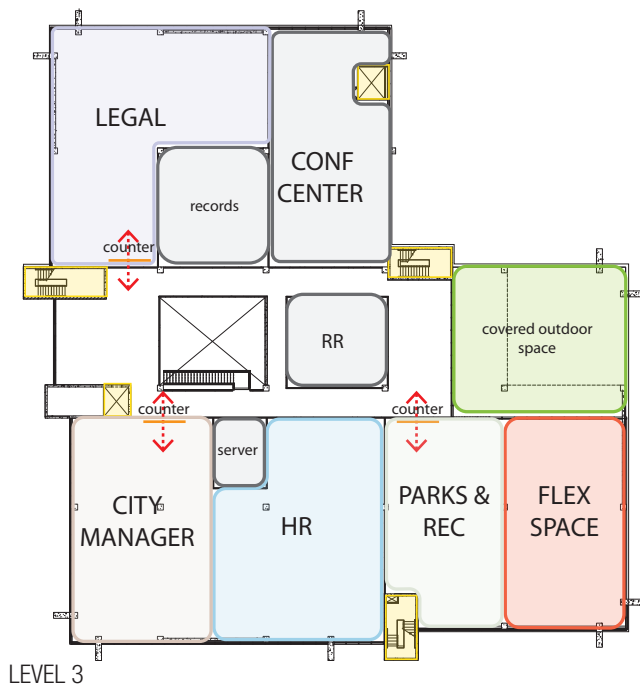


DEPARTMENTAL AREA - FIRST FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
ELEV	CIRCULATION	77 SF
WEST STAIR	CIRCULATION	203 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION	CIRCULATION	213 SF
CIRCULATION	CIRCULATION	217 SF
VESTIBULE	CIRCULATION	197 SF
CIRCULATION: 8		1287 SF
ELECTRICAL	COMMON	40 SF
RISER	COMMON	105 SF
RESTROOM	COMMON	79 SF
ELECTRICAL	COMMON	314 SF
STOR	COMMON	88 SF
RESTROOM	COMMON	328 SF
RESTROOM	COMMON	323 SF
JANITOR	COMMON	46 SF
ELECTRICAL	COMMON	88 SF
LOBBY	COMMON	2969 SF
COMMON: 10		4379 SF
SESSIONS	COUNCIL CHAMBERS	317 SF
COUNCIL CHAMBERS	COUNCIL CHAMBERS	3066 SF
COUNCIL CHAMBERS: 2		3382 SF
COURT ADMIN	COURTS	3091 SF
COURTS: 1		3091 SF
POLICE	POLICE	14211 SF
POLICE: 1		14211 SF
POLICE ADDITION	POLICE ADDITION	6335 SF
SALLYPORT & SECURED PARKING	POLICE ADDITION	4934 SF
POLICE ADDITION: 2		11268 SF
Grand total: 24		37618 SF



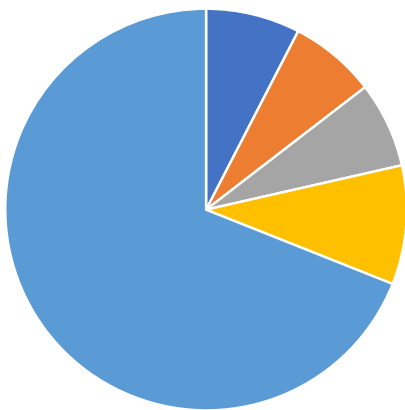
## OPTION NAME D

DEPARTMENTAL AREA - SECOND FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	77 SF
NORTH STAIR	CIRCULATION	203 SF
ELEV	CIRCULATION	64 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	161 SF
CIRCULATION: 5		663 SF
LOBBY	COMMON	4829 SF
CONFERENCE CENTER	COMMON	2821 SF
RESTROOMS	COMMON	826 SF
BREAK ROOM	COMMON	1077 SF
WELLNESS	COMMON	798 SF
COMMON: 5		10351 SF
CED	COMMUNITY & ECONOMIC DEVELOPMENT	4692 SF
COMMUNITY & ECONOMIC DEVELOPMENT: 1		4692 SF
FINANCE	FINANCE	3260 SF
FINANCE: 1		3260 SF
GREEN ROOF	OUTDOOR	10051 SF
OUTDOOR: 1		10051 SF
PARKS	PARKS	1888 SF
PARKS: 1		1888 SF
PUBLIC WORKS	PUBLIC WORKS	4088 SF
PUBLIC WORKS: 1		4088 SF
Grand total: 15		34993 SF



## OPTION NAME D

DEPARTMENTAL AREA - THIRD FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
EAST STAIRS	CIRCULATION	158 SF
NORTH STAIRS	CIRCULATION	203 SF
ELEV	CIRCULATION	77 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION	CIRCULATION	4057 SF
CIRCULATION: 6		4717 SF
CITY MANAGER	CITY MANAGER	2860 SF
CITY MANAGER: 1		2860 SF
STORAGE	COMMON	149 SF
RESTROOMS	COMMON	826 SF
CONFERENCE CENTER	COMMON	2465 SF
SERVER	COMMON	334 SF
RECORDS	COMMON	1179 SF
COMMON: 5		4953 SF
FLEX SPACE	FLEX SPACE	2272 SF
FLEX SPACE: 1		2272 SF
HUMAN RESOURCES	HUMAN RESOURCES	3128 SF
HUMAN RESOURCES: 1		3128 SF
LEGAL	LEGAL	3414 SF
LEGAL: 1		3414 SF
COVERED OUTDOOR SPACE	OUTDOOR	2372 SF
OUTDOOR: 1		2372 SF
PARKS	PARKS	2184 SF
PARKS: 1		2184 SF
Grand total: 17		25899 SF



- Construction Costs
- A&E Service Fees
- Sales Tax
- Owner Contingency
- Other Soft Costs
- Total Project Cost

#### OPTION A

\$50,937,837.05  
 \$5,603,162.08 (11%)  
 \$5,144,721.54 (10.1%)  
 \$5,093,783.71 (10%)  
 \$7,080,357.35 (13.9%)  
 \$73,859,863.72

#### OPTION B

\$52,617,674.00  
 \$5,787,944.14 (11%)  
 \$5,314,385.07 (10.1%)  
 \$5,261,767.40 (10%)  
 \$7,313,856.69 (13.9%)  
 \$76,295,627.30

# EXECUTIVE SUMMARY

## ASSESSMENT & RECOMMENDATIONS

### CONCEPT OPTIONS

### **COST ANALYSIS**

### APPENDIX



# OVERVIEW

## EXPLANATION OF SOFT, HARD, AND PROJECT COSTS

Soft costs can be incurred anywhere along the life cycle of a project: concept, pre-construction, construction, and post construction. They include everything from architectural and engineering fees to legal fees, pre- and post-construction expenses, permits and taxes, movable furniture and equipment, security vendors, utility hookups, insurance, etc. In short, soft costs are *all* project costs that are *not* the pre-sales tax construction costs (hard costs) negotiated with your general contractor to build the project.

Soft costs can typically account for roughly 35 to 75 percent of a total construction budget. For the purposes of this feasibility study, and given most of the soft costs are unknown at this stage, industry standards allocate 45% of the construction (hard) costs as your soft cost allowance. Varying project specifications and changing economic factors can make estimating soft costs more difficult. Common soft costs are often broken out into different categories of costs. Below is a quick look at some of the major costs in these different categories.

### ***Professional Architectural and Engineering Service Fees (between 7-15% of the 45% soft cost total)***

These fees include feasibility studies such traffic studies, geotechnical studies, testing consultants, professional architectural and engineering services, and special inspection and commissioning services. Construction value, project difficulty and quantity, and involvement of additional (specialty) consultants impact overall Service Fees.

### ***Sales Tax (10.1% of the 45% soft cost total)***

Construction (hard) costs are bid excluding sales tax, and sales tax for construction costs are considered a soft cost.

### ***Owner Construction Contingency (8-10% of the 45% soft cost total)***

A construction contingency is an amount of money set aside to cover any unexpected costs that can arise throughout a construction project. This money is on reserve and is not allocated to any specific area of work. Essentially, the contingency acts as insurance against other, unforeseen costs. ARC advocates for a minimum 10% of the construction (hard) costs for risk management.

### ***Other Soft Costs (9.9-19.9% of the 45% soft cost total)***

- Land and real estate costs associated with the legal process, appraisal fees, land acquisition, assessments, land survey fees, and costs for inspections and permit fees paid to local governments related to applications, cost to file, occupancy permits, etc.
- Rentals, Equipment and Tools
- Loans, Accounting, Finance and Insurance fees
- Project Management, Taxes - These fees include compensation for the staff required to handle construction related documentation and drawings, security and safety staff, temporary staffing, runners, and of course, all taxes on the project assessed by local and state agencies.
- Fixtures, Furnishing and Equipment
- Advertising, Marketing, PR fees
- Post-Construction - Upon completion of the project soft costs may include lingering legal fees, sales/leasing, building management fees, repair and maintenance, replacement costs, landscaping, security, insurance and taxes. And replacement costs for things like such as movable furniture, hardware and software, security, internet and telephone systems.

# EXECUTIVE SUMMARY

## ASSESSMENT & RECOMMENDATIONS

### CONCEPT OPTIONS

### COST ANALYSIS

## **APPENDIX**

A	-	SeaTac City Hall Departmental Space Requirements
B	-	SeaTac City Hall Departmental Adjacencies
C	-	Space Standards with Example Layout Sketches, Beckwith Consulting Group
D	-	SeaTac City Hall Existing Building Plans
E	-	SeaTac City Hall Recommended Design Option
F	-	SeaTac City Hall Seismic Evaluation, 10/11/2007
G	-	SeaTac City Hall Building Envelope Evaluation, 10/14/2020
H	-	SeaTac City Hall Limited Hazardous Building Material Survey, 12/2020
I	-	SeaTac City Hall Asbuilt Panel Locations & Electrical One-Line Diagram, 10/22/2020
J	-	Telecommunications Supporting Codes and Standards
K	-	Mechanical Common Abbreviations and Acronyms
L	-	ASHRAE Equipment Life Expectancy Chart
M	-	SeaTac City Hall Existing Equipment & Phasing Recommendations
N	-	SeaTac City Hall Asbuilt Energy Model Supporting Documentation, 10/20/2020
O	-	SeaTac City Hall Feasibility Cost Estimate, 02/24/2021
P	-	Records Room Requirements Correspondence

## *APPENDIX A*

## Functional requirements

### Full time equivalent (FTE) staff projections

21 October 2020

Departments	Full time equivalents (FTE)			FTE/1,000 population			FTE Growth 6.0-8.0
	30.0	35.0	40.0	30.0	35.0	40.0	
City Manager	8	9	9	0.27	0.30	0.23	113%
Community & Economic Dvpmnt	22	22	25	0.73	0.73	0.63	114%
Finance & Systems	13	13	13	0.43	0.43	0.33	100%
Human Resources	3	5	6	0.10	0.17	0.15	200%
Legal Department	14	15	16	0.47	0.50	0.40	114%
Municipal Court	6	6	6	0.20	0.20	0.15	100%
Parks & Recreation - City Hall	6	6	8	0.20	0.20	0.20	133%
Police	48	85	107	1.60	2.83	2.68	223%
Public Works - City Hall	23	26	26	0.77	0.87	0.65	113%
<b>Total</b>	<b>143</b>	<b>187</b>	<b>216</b>	<b>4.77</b>	<b>5.34</b>	<b>5.40</b>	<b>151%</b>

### Functional requirements - all departments

Building elements	Building reqmnt (nsf)			Net-gros multipli	Building footprint requirement			GBA Growth 6.0-8.0
	30.0	35.0	40.0		30.0	35.0	40.0	
Common/Support Areas	9,729	10,858	12,115	1.15	11,188	12,487	13,932	125%
City Manager	1,947	2,082	2,082	1.15	2,239	2,394	2,394	107%
Community & Economic Dvpmnt	4,259	4,259	4,664	1.15	4,898	4,898	5,364	110%
Finance & Systems	3,224	3,246	3,269	1.15	3,708	3,733	3,759	101%
Human Resources	2,536	2,860	3,022	1.15	2,916	3,289	3,475	119%
Legal Department	1,971	2,133	3,319	1.15	2,267	2,453	3,817	168%
Municipal Court	4,636	5,004	5,333	1.15	5,331	5,755	6,133	115%
Parks & Recreation - City Hall	1,597	1,597	1,759	1.15	1,837	1,837	2,023	110%
Police	16,481	22,728	25,965	1.15	18,953	26,137	29,860	158%
Public Works - City Hall	3,352	3,813	3,813	1.15	3,855	4,385	4,385	114%
<b>Total</b>	<b>49,732</b>	<b>58,580</b>	<b>65,341</b>		<b>57,192</b>	<b>67,367</b>	<b>75,142</b>	<b>131%</b>

### Parking requirements - City Hall

Parking employees	Parking requirement (each)			Site multipli	Site requirement (bldg+site)			GBA Growth
	30.0	35.0	40.0		30.0	35.0	40.0	
City Manager	8	9	9					113%
Community & Economic Dvpmnt	22	22	25					114%
Finance & Systems	13	13	13					100%
Human Resources	3	5	6					
Legal Department	14	15	16					
Municipal Court	6	6	6					
Parks & Recreation - City Hall	6	6	8					
Police	48	85	107					
Public Works - City Hall	23	26	26					
Subtotal	143	187	216					151%
75%	107	140	162	300	32,175	42,075	48,600	
City vehicles and visitors								
Cars	2	3	4	300	600	900	1,200	
0.5 ton trucks	7	7	7	400	2,800	2,800	2,800	
12-14 person passenger vans	2	3	4	400	800	1,200	1,600	
Ford Escape SUV	7	8	9	300	2,100	2,400	2,700	
Cargo van	1	1	1	300	300	300	300	
Police Radar Trailer	1	1	1	200	200	200	200	
Visitors - city hall day counters	12	14	16	300	3,600	4,200	4,800	
Visitors - city hall day meetings	12	14	16	300	3,600	4,200	4,800	
Visitors - court day sessions	24	26	28	300	7,200	7,800	8,400	
Subtotal parking	175	217	248		53,375	66,075	75,400	141%
Subtotal building - 1 story footprint					57,192	67,367	75,142	131%
Total site in square feet					110,567	133,442	150,542	136%
Total site in acres - buildable or covered area					2.5	3.1	3.5	136%
Subtotal parking	175	217	248		53,375	66,075	75,400	141%
Subtotal building - 3 story footprint					19,064	22,456	25,047	131%
Total site in square feet					72,439	88,531	100,447	139%
Total site in acres - buildable or covered area					1.7	2.0	2.3	139%

21 September 2020

	space code	std FTEs/1000 popula nsf	30.0	35.0	40.0	net sq ft/1,000 population 30.0	35.0	40.0	Comments
<b>Administration</b>						<b>0</b>	<b>0</b>	<b>0</b>	
1 All staff support						0	0	0	
Subtotals (personnel and nsf)			0	0	0	0	0	0	
Plus circulation factor (percent of nsf)		35%				0	0	0	
Total personnel nsf required						0	0	0	
Plus special areas and equipment nsf						9,729	10,858	12,115	
Total departmental nsf required						9,729	10,858	12,115	
Layout factor		0%				0	0	0	
<b>Total nsf required including layout</b>						<b>9,729</b>	<b>10,858</b>	<b>12,115</b>	
Area factor (nsf per person)						na	na	na	
Staff growth								na	
Space growth (nsf)								25%	

	space code	std FTEs/1000 popula nsf	30.0	35.0	40.0	net sq ft/1,000 population 30.0	35.0	40.0	Comments
<b>Lobby</b>						<b>790</b>	<b>940</b>	<b>1,090</b>	
1 lobby display cases/area	sa	40	1	1	1	40	40	40	w/art displays/bulletins
2 lobby queuing area	each	15	50	60	70	750	900	1,050	access Chamber
3 department counters						0	0	0	see departments
<b>Council Chambers/Sessions</b>						<b>3,754</b>	<b>3,994</b>	<b>4,234</b>	flexible/adaptable layout
4 Council podium	each	24	7	7	7	168	168	168	
5 staff seating/worktable	each	24	9	9	9	216	216	216	
6 flexible presentation/podium	each	20	1	1	1	20	20	20	
7 public seating area	each	24	80	90	100	1,920	2,160	2,400	moveable flexible seating
8 catering/coffee area	ked1	72	1	1	1	72	72	72	
9 Council sessions room	each	24	36	36	36	864	864	864	executive conference
10 audiovisual storage/workstation	sa	264	1	1	1	264	264	264	
11 chair/equipment storage	sr	180	1	1	1	180	180	180	
12 toilet room - ADA	tl2	50	1	1	1	50	50	50	
<b>Adjacent conference center</b>						<b>1,512</b>	<b>1,752</b>	<b>1,992</b>	
13 conference rooms	cro5	240	6	7	8	1,440	1,680	1,920	
14 kitchenette/catering/coffee area	ked1	72	1	1	1	72	72	72	
<b>Records center and active archives</b>						<b>909</b>	<b>1,045</b>	<b>1,181</b>	
15 breakdown, misc open area	se	80	1	1	1	80	80	80	
16 worktable, access 4 sides	wta4	75	1	1	1	75	75	75	
17 safe	sa	12	2	2	2	24	24	24	
18 shredder	se	12	1	1	1	12	12	12	
19 waste receptacles	se	12	2	3	4	24	36	48	
20 roller cart	se	12	1	1	1	12	12	12	
21 hand truck/dolly	se	12	1	1	1	12	12	12	
22 file cabinets, vert 4 dwr	fvb4	9	14	18	22	126	162	198	
23 industrial shelving, open	isc3	16	28	32	36	448	512	576	72 box capacity/shelving
24 presentation boards	sa	12	2	3	4	24	36	48	
25 plan bins	se	12	6	7	8	72	84	96	
<b>Loading dock</b>						<b>251</b>	<b>263</b>	<b>275</b>	
26 breakdown, misc open area	se	80	1	1	1	80	80	80	
27 workcounter, access 1 side	wca1	15	3	3	3	45	45	45	tools/equipment
28 storage cabinet w/shelves, 2 doors	scc3	22	1	1	1	22	22	22	tools/equipment
29 storage cage	sa	80	1	1	1	80	80	80	furniture etc
30 recycle bins	se	12	2	3	4	24	36	48	
<b>Mud room and custodial</b>						<b>163</b>	<b>163</b>	<b>163</b>	
31 lockers day use	se	12	1	1	1	12	12	12	Comty/Economic Dvpmt
32 lockers day use	se	12	4	4	4	48	48	48	Public Works
33 toilet w/shower	tl3	79	1	1	1	79	79	79	mud/hazards
34 storage cages	sa	24	1	1	1	24	24	24	equipment
<b>Wellness</b>						<b>336</b>	<b>480</b>	<b>624</b>	
35 lockers day use	sa	12	8	10	12	96	120	144	10% of staff
36 restroom/shower	sa	40	4	5	6	160	200	240	50% of users
37 bicycle storage	sa	80	1	2	3	80	160	240	bike racks
<b>Employee lunch/break room - w/outside access</b>						<b>745</b>	<b>805</b>	<b>976</b>	
38 tables/chairs	each	15	36	40	44	540	600	660	20% of City Hall staff
39 kitchenette	ked1	77	2	2	3	154	154	231	w/sink/microwaves
40 refrigerator	keal	17	2	2	3	34	34	51	
41 freezer	keal	17	1	1	2	17	17	34	
<b>Subtotals</b>			<b>323</b>	<b>364</b>	<b>408</b>	<b>8,460</b>	<b>9,442</b>	<b>10,535</b>	
<b>Plus circulation factor (percent of nsf)</b>		<b>15%</b>				<b>1,269</b>	<b>1,416</b>	<b>1,580</b>	
<b>Total special area and equipment nsf</b>						<b>9,729</b>	<b>10,858</b>	<b>12,115</b>	



## City Manager

Page 1 of 2

21 September 2020

Carl Cole, City Manager

206-973-4810

[ccole@seatacwa.gov](mailto:ccole@seatacwa.gov)

	space code	nsf	std FTEs/1000 popula 30.0	35.0	40.0	net sq ft/1,000 population 30.0	35.0	40.0	Comments
<b>Administration</b>						<b>980</b>	<b>1,080</b>	<b>1,080</b>	
1 City Manager	po3	160	1	1	1	160	160	160	adjacent conference room
2 Deputy City Manager	po2	140	1	1	1	140	140	140	
3 Govt Relations/Comm Mgr	po1	120	1	1	1	120	120	120	
4 Executive Assistant	po1	120	1	1	1	120	120	120	
5 Sr Management Analyst	po1	120	2	2	2	240	240	240	
6 AA2 Graphic Design Specialist	os4	100	1	1	1	100	100	100	
7 AA1 Graphic Design Specialist	os4	100	1	2	2	100	200	200	handle events
Subtotals (personnel and nsf)			8	9	9	980	1,080	1,080	
Plus circulation factor (percent of nsf)		35%				343	378	378	
Total personnel nsf required						1,323	1,458	1,458	
Plus special areas and equipment nsf						624	624	624	
Total departmental nsf required						1,947	2,082	2,082	
Layout factor		0%				0	0	0	
<b>Total nsf required including layout</b>						<b>1,947</b>	<b>2,082</b>	<b>2,082</b>	
Area factor (nsf per person)						243	231	231	
Staff growth								13%	
Space growth (nsf)								7%	

## City Manager

Page 2 of 2

	space code	nsf	std FTEs/1000 popula 30.0	35.0	40.0	net sq ft/1,000 population 30.0	35.0	40.0	Comments
<b>Equipment out of office/workstations</b>						<b>269</b>	<b>269</b>	<b>269</b>	
1 Council offices/work area	cr5	240	1	1	1	240	240	240	w/City Manager
2 Executive conference room						0	0	0	see common file
3 kitchenette						0	0	0	see common file
4 layout table	stb1	29	1	1	1	29	29	29	
<b>Public counter and conference</b>						<b>108</b>	<b>108</b>	<b>108</b>	
5 reception, 4 person	ra2	108	1	1	1	108	108	108	
6 conference room, 12 person	cr5	240				0	0	0	see Common file
7 executive conference, 24 person	cr+	480				0	0	0	see Common file
<b>Common work area - share</b>						<b>122</b>	<b>122</b>	<b>122</b>	
8 workcounter, access 1 side	wca8	34	1	1	1	34	34	34	storage over/under
9 storage cabinet	scc3	22	1	1	1	22	22	22	supplies
10 photocopier, medium	pc2	42	1	1	1	42	42	42	
11 shredder	se	12	1	1	1	12	12	12	
12 fax	se	12	1	1	1	12	12	12	
Subtotals			8	8	8	499	499	499	
Plus circulation factor (percent of nsf)		25%				125	125	125	
Total special area and equipment nsf						624	624	624	

## Community & Economic Development

Page 1 of 2

21 September 2020

Evan Maxim, Director

	space code	nsf	std FTEs/1000 30.0	populatic 35.0	net sq ft/1,000 40.0	population 30.0	35.0	40.0	Comments
<b>Administration</b>						<b>240</b>	<b>240</b>	<b>240</b>	
1 Director	po3	160	1	1	1	160	160	160	
2 Administrative Assistant 3	os3	80	1	1	1				
3 Administrative Assistant 2	os3	80	1	1	1	80	80	80	
<b>Building Services</b>						<b>740</b>	<b>740</b>	<b>840</b>	
4 Building Services Manager	po2	140	1	1	1	140	140	140	
5 Building Supervisor	os4	100	1	1	1	100	100	100	
6 Plans Examiner Inspector 2	os4	100	3	3	4	300	300	400	
7 Code Compliance Prgm Coordinator	os4	100	2	2	2	200	200	200	
<b>Permit Center</b>						<b>420</b>	<b>420</b>	<b>420</b>	
8 Permit Center Supervisor	po1	120	1	1	1	120	120	120	adjacent counters
9 Senior Permit Coordinator	os4	100	1	1	1	100	100	100	adjacent counters
10 Permit Coordinator	os4	100	2	2	2	200	200	200	adjacent counters
<b>Planning</b>						<b>620</b>	<b>620</b>	<b>720</b>	
11 Planning Manager	po2	140	1	1	1	140	140	140	
12 Senior Planner	os4	100	2	2	2	200	200	200	
13 Associate Planner	os4	100	1	1	2	100	100	200	
14 Assistant Planner	os4	100	1	1	1	100	100	100	
15 Planning Intern	os3	80	1	1	1	80	80	80	
<b>Economic Development</b>						<b>220</b>	<b>220</b>	<b>320</b>	
16 Economic Development Manager	po1	120	1	1	1	120	120	120	
17 Economic Development Strategist	os4	100	1	1	2	100	100	200	
Subtotals (personnel and nsf)			22	22	25	2,240	2,240	2,540	
Plus circulation factor (percent of nsf)		35%				784	784	889	
Total personnel nsf required						3,024	3,024	3,429	
Plus special areas and equipment nsf						1,235	1,235	1,235	
Total departmental nsf required						4,259	4,259	4,664	
Layout factor		0%				0	0	0	
<b>Total nsf required including layout</b>						<b>4,259</b>	<b>4,259</b>	<b>4,664</b>	
Area factor (nsf per person)						194	194	187	
Staff growth								14%	
Space growth (nsf)								10%	

	space code	nsf	std FTEs/1000 30.0	populatic 35.0	net sq ft/ 40.0	30.0	35.0	40.0	Comments
<b>Equipment out off office/workstation</b>						<b>0</b>	<b>0</b>	<b>0</b>	
1						0	0	0	
2						0	0	0	
3						0	0	0	
4						0	0	0	
5						0	0	0	
6						0	0	0	
7						0	0	0	
8						0	0	0	
9						0	0	0	
10						0	0	0	
11						0	0	0	
12						0	0	0	
<b>Public counter and conference</b>						<b>782</b>	<b>782</b>	<b>782</b>	
13	plan/project exhibits layout	sa	64	1	1	64	64	64	
14	information rack	se	12	2	2	24	24	24	
15	customer queuing - 8 person	ra4	192	2	2	384	384	384	
16	workcounter, access 2 sides	wcb8	34	2	2	68	68	68	w/monitors/printer
17	workcounter, access 2 sides	wcb8	34	1	1	34	34	34	ADA sitting/self help desk
18	conference room, 6 person	cr2	140	1	1	140	140	140	at counter/share
19	photocopier, small	pc1	30	1	1	30	30	30	counter shared
20	plan submittal rack - plan bins	se	10	1	1	10	10	10	
21	vertical plan hold	mic1	18	1	1	18	18	18	counter - maps
22	bookcase, 3 shelves	bca3	10	1	1	10	10	10	public documents
23	storage cabinet, w/shelves, 2 doors	sca3	0	3	3	0	0	0	under counter - more forms
24	conference room, 12 person	cr5	0	1	1	0	0	0	share - see common file
<b>Common work area</b>						<b>206</b>	<b>206</b>	<b>206</b>	
25	workcounter, access 1 side	wca8	34	2	2	68	68	68	w/storage over/under
26	storage cabinet	scc3	22	1	1	22	22	22	supplies
27	photocopier, medium	pc1	24	1	1	24	24	24	
28	printer, black and white	pc2	42	1	1	42	42	42	
29	printer, color	psa2	26	1	1	26	26	26	
30	shredder	se	12	1	1	12	12	12	
31	waste receptacle	se	12	1	1	12	12	12	
<b>Storage room - see common file</b>						<b>0</b>	<b>0</b>	<b>0</b>	
32	industrial shelving, open boxes	box	0.5			0	0	0	
33	industrial shelving, open	isc3	16			0	0	0	
34	plan bin	se	12			0	0	0	
35	presentation boards	sa	12			0	0	0	
<b>Subtotals</b>				<b>25</b>	<b>25</b>	<b>25</b>	<b>988</b>	<b>988</b>	<b>988</b>
<b>Plus circulation factor (percent of nsf)</b>			<b>25%</b>				<b>247</b>	<b>247</b>	<b>247</b>
<b>Total special area and equipment nsf</b>						<b>1,235</b>	<b>1,235</b>	<b>1,235</b>	

## Finance & Systems

Page 1 of 2

21 September 2020

Gwen Pilo, Finance & Systems Director 206-973-4882

	space	std	FTEs/1000	popula	net	sq ft/1,000	population	
	code	nsf	30.0	35.0	40.0	30.0	35.0	40.0
								Comments
<b>Finance &amp; Systems Director</b>						<b>700</b>	<b>700</b>	<b>700</b>
1 Finance & Systems Director	po2	140	1	1	1	140	140	140
2 Budget Analyst	po1	120	1	1	1	120	120	120
3 Accounting Analyst	os3	80	1	1	1	80	80	80
4 Treasury Operations Manager	po1	120	1	1	1	120	120	120
5 Payroll Coordinator	os3	80	1	1	1	80	80	80 depends on staffing levels
6 Accounting Technican	os3	80	2	2	2	160	160	160
<b>GIS/IS</b>						<b>560</b>	<b>560</b>	<b>560</b>
7 Information Systems Manager	po1	120	1	1	1	120	120	120
8 GIS Project Coordinator	os3	80	1	1	1	80	80	80
9 GIS Systems Analyst	os4	100	1	1	1	100	100	100
10 GIS Analyst	os4	100	1	1	1	100	100	100
11 IS Technician	os3	80	1	1	1	80	80	80 depends on staffing levels
12 Information Systems Analyst	os3	80	1	1	1	80	80	80 depends on staffing levels
Subtotals (personnel and nsf)			13	13	13	1,260	1,260	1,260
Plus circulation factor (percent of nsf)		35%				441	441	441
Total personnel nsf required						1,701	1,701	1,701
Plus special areas and equipment nsf						1,523	1,545	1,568
Total departmental nsf required						3,224	3,246	3,269
Layout factor		0%				0	0	0
<b>Total nsf required including layout</b>						<b>3,224</b>	<b>3,246</b>	<b>3,269</b>
Area factor (nsf per person)						248	250	251
Staff growth								0%
Space growth (nsf)								1%

	space code	nsf	std FTEs/1000 popula			net sq ft/1,000 population			Comments
			30.0	35.0	40.0	30.0	35.0	40.0	
<b>Equipment out of office/workstation</b>						<b>0</b>	<b>0</b>	<b>0</b>	
1						0	0	0	
2						0	0	0	
3						0	0	0	
4						0	0	0	
5						0	0	0	
6						0	0	0	
7						0	0	0	
8						0	0	0	
9						0	0	0	
10						0	0	0	
11						0	0	0	
12						0	0	0	
<b>Public counter and conference - share w/City Manager</b>						<b>358</b>	<b>358</b>	<b>358</b>	
13	customer queuing - 8 person	ra4	192	1	1	1	192	192	
14	kids play area	sa	64	1	1	1	64	64	w/queuing area
15	workcounter, access 2 sides	wcb8	34	1	1	1	34	34	w/monitors/cash/printer
16	workcounter, access 2 sides	wcb8	34	1	1	1	34	34	business license
17	information rack	se	12	1	1	1	12	12	
18	information rack	se	12	1	1	1	12	12	pet licensing info
19	bookcase, 4 shelves	bca4	10	1	1	1	10	10	public info
20	conference room, 6 person	cr2	0	1	1	1	0	0	share w/other counter user
21	conference room, 12 person	cr5	0				0	0	see Common file
<b>IT server/work area/room</b>						<b>510</b>	<b>510</b>	<b>510</b>	
22	server racks - 10	sa	120	1	1	1	120	120	controlled HVAC
23	breakdown, misc open area	se	42	1	1	1	42	42	outside HVAC controlled
24	industrial shelving, open	isc3	16	1	1	1	16	16	components
25	workcounter, access 1 side	wca8	34	1	1	1	34	34	
26	workstation	os1	48	1	1	1	48	48	
27	photocopier, small	pc1	30	1	1	1	30	30	
28	MICR printer	pc2	42	1	1	1	42	42	
29	worktable, access 4 sides	wtb4	88	1	1	1	88	88	
30	vertical file, 4 drawer lockable	fva4	8	1	1	1	8	8	
31	shredder	se	12	1	1	1	12	12	
32	storage cabinet, 2 doors	scc3	22	2	2	2	44	44	
33	bookcase, 4 shelves	bcb4	13	2	2	2	26	26	
<b>Records area</b>						<b>194</b>	<b>212</b>	<b>230</b>	
34	safe	se	26	1	1	1	26	26	
35	file cabinet, 4 dwr vert legal	fvb4	9	14	16	18	126	144	
36	breakdown, misc open area	se	42	1	1	1	42	42	
<b>Common work area - share with City Manager</b>						<b>156</b>	<b>156</b>	<b>156</b>	
37	workcounter, access 1 side	wca8	34	2	2	2	68	68	w/storage over/under
38	storage cabinet	scc3	22	1	1	1	22	22	office supplies
39	photocopier, medium color	pc2	42	1	1	1	42	42	
40	shredder	se	12	1	1	1	12	12	
41	waste receptable	se	12	1	1	1	12	12	
<b>Subtotals</b>			<b>44</b>	<b>46</b>	<b>48</b>	<b>1,218</b>	<b>1,236</b>	<b>1,254</b>	
<b>Plus circulation factor (percent of nsf)</b>			<b>25%</b>			<b>305</b>	<b>309</b>	<b>314</b>	
<b>Total special area and equipment nsf</b>						<b>1,523</b>	<b>1,545</b>	<b>1,568</b>	



## Human Resources &amp; Risk Management Department

Page 1 of 2

21 September 2020

Vanessa Audett, Director

206-973-4640

	space code	nsf	std FTEs/1000 30.0	popula 35.0	net sq ft/1,000 40.0	population 30.0	35.0	40.0	Comments
<b>HR &amp; Risk Mgt</b>						<b>360</b>	<b>600</b>	<b>720</b>	
1 Director	po3	160	1	1	1	160	160	160	access to conference room
2 Senior Human Resources Analyst	po1	120	0	1	1	0	120	120	
3 Human Resources Analyst	po1	120	1	2	3	120	240	360	
4 Human Resources Technician	os3	80	1	1	1	80	80	80	
Subtotals (personnel and nsf)			3	5	6	360	600	720	
Plus circulation factor (percent of nsf)		35%				126	210	252	
Total personnel nsf required						486	810	972	
Plus special areas and equipment nsf						2,050	2,050	2,050	
Total departmental nsf required						2,536	2,860	3,022	
Layout factor		0%				0	0	0	
<b>Total nsf required including layout</b>						<b>2,536</b>	<b>2,860</b>	<b>3,022</b>	
Area factor (nsf per person)						845	572	504	
Staff growth							67%	20%	
Space growth (nsf)							13%	6%	

## Human Resources &amp; Risk Management Department

Page 2 of 2

	space code	nsf	std FTEs/1000 30.0	popula 35.0	net sq ft/1,000 40.0	population 30.0	35.0	40.0	Comments
<b>Equipment out of office/workstation</b>						<b>92</b>	<b>92</b>	<b>92</b>	
1 file cabinet, vertical 5 dwr legal	fva5	8	1	1	1	8	8	8	w/HR Analyst
2 file cabinet, vertical 2 dwr legal	fva2	8	1	1	1	8	8	8	w/HR Analyst
3 file cabinet, lateral 3 dwr	fla3	10	1	1	1	10	10	10	w/HR Analyst
4 file cabinet, lateral 2 dwr	fla2	10	1	1	1	10	10	10	w/HR Analyst
5 bookcase, 3 shelves	bcc3	16	2	2	2	32	32	32	w/HR Analyst
6 file cabinet, vertical 2 dwr legal	fva2	8	1	1	1	8	8	8	w/HR Technician
7 bookcase, 6 shelves	bcc6	16	1	1	1	16	16	16	w/HR Technician
<b>Reception</b>						<b>226</b>	<b>226</b>	<b>226</b>	
8 customer queuing - 8 person	ra4	192	1	1	1	192	192	192	
9 workcounter, access 2 sides	wcb8	34	1	1	1	34	34	34	reception
<b>Records</b>						<b>114</b>	<b>114</b>	<b>114</b>	
10 file cabinet, lateral 2 dwr	fla2	10	2	2	2	20	20	20	
11 file cabinet, lateral 3 dwr	fla3	10	3	3	3	30	30	30	
12 file cabinet, vertical 4 dwrs	fva4	8	5	5	5	40	40	40	
13 file cabinet, vertical 5 dwrs	fva5	8	3	3	3	24	24	24	
<b>Common work area</b>						<b>384</b>	<b>384</b>	<b>384</b>	
14 workcounter, access 1 side	wca8	34	2	2	2	68	68	68	w/storage over/under
15 storage cabinet	scc3	22	3	3	3	66	66	66	office supplies/forms
16 photocopier, medium color	pc2	42	1	1	1	42	42	42	
17 photocopier, large	pc3	172	1	1	1	172	172	172	
18 shredder	se	12	1	1	1	12	12	12	
19 waste/recycle receptable	se	12	2	2	2	24	24	24	
<b>Conference</b>						<b>824</b>	<b>824</b>	<b>824</b>	
20 Interview/conference, 10 person	cr4	224	1	1	1	224	224	224	w/computer, bookcases
21 Training room, 40 person	sa	15	40	40	40	600	600	600	dedicated, smart
Subtotals			25	25	25	1,640	1,640	1,640	
Plus circulation factor (percent of nsf)		25%				410	410	410	
Total special area and equipment nsf						2,050	2,050	2,050	

6 October 2020

Mary Mirante Bartolo, City Attorney

206-973-4640

	space	std FTEs/1000 popula	net sq ft/1,000 population							
	code	nsf	30.0	35.0	40.0	30.0	35.0	40.0	Comments	
<b>City Attorney</b>						<b>580</b>	<b>700</b>	<b>820</b>		
1	City Attorney	po3	160	1	1	1	160	160	160	
2	Senior Assistant City Attorney	po2	140	1	1	1	140	140	140	
3	Legal Analyst	os3	80	1	1	1	80	80	80	
4	Legal Dept Assistant	os3	80	1	1	1	80	80	80	
5	Contingency office	po1	120	1	2	3	120	240	360	
<b>Criminal</b>						<b>520</b>	<b>520</b>	<b>520</b>		
6	Assistant City Attorney	po1	120	1	1	1	120	120	120	
7	Prosecuting Attorney	po1	120	1	1	1	120	120	120	
8	Prosecuting Attorney - part-time	po1	120	1	1	1	120	120	120	
9	Criminal Paralegal	os3	80	1	1	1	80	80	80	
10	Victim & Crisis Advocate	os3	80	1	1	1	80	80	80	
<b>Civil</b>						<b>360</b>	<b>360</b>	<b>360</b>		
11	City Clerk	po1	120	1	1	1	120	120	120	
12	Records Manager	os3	80	1	1	1	80	80	80	
13	Records Coordinator	os3	80	1	1	1	80	80	80	
14	Intern/Temporary	os3	80	1	1	1	80	80	80	
Subtotals (personnel and nsf)				14	15	16	1,460	1,580	1,700	
Plus circulation factor (percent of nsf)			35%				511	553	595	
Total personnel nsf required							1,971	2,133	2,295	
Plus special areas and equipment nsf							0	0	1,024	
Total departmental nsf required							1,971	2,133	3,319	
Layout factor			0%				0	0	0	
<b>Total nsf required including layout</b>							<b>1,971</b>	<b>2,133</b>	<b>3,319</b>	
Area factor (nsf per person)							141	142	207	
Staff growth									14%	
Space growth (nsf)									68%	

	space	std FTEs/1000 popula	net sq ft/1,000 population							
	code	nsf	30.0	35.0	40.0	30.0	35.0	40.0	Comments	
<b>Equipment out of office/workstation</b>						<b>0</b>	<b>0</b>	<b>0</b>		
1						0	0	0		
2						0	0	0		
3						0	0	0		
4						0	0	0		
5						0	0	0		
6						0	0	0		
7						0	0	0		
8						0	0	0		
9						0	0	0		
10						0	0	0		
11						0	0	0		
12						0	0	0		
<b>Public counter and conference</b>						<b>0</b>	<b>0</b>	<b>503</b>		
13	customer queuing - 2 person	ra1	63		1	0	0	63		
14	workcounter, access 2 sides	wcb8	34		1	0	0	34	reception	
15	information rack	se	12		1	0	0	12		
16	bookcase, 4 shelves	bca4	10		1	0	0	10	public info	
17	conference room, 8 person	cr3	144		1	0	0	144	dedicated/interview room	
18	conference room, 12 person	cr5	240		1	0	0	240	dedicated/law library	
<b>Records</b>						<b>0</b>	<b>0</b>	<b>160</b>		
19	file cabinet, 4 dwr vert legal	fvb4	9		6	0	0	54		
20	industrial shelving, open	isc3	16		4	0	0	64		
21	breakdown, misc open area	se	42		1	0	0	42		
<b>Common work area</b>						<b>0</b>	<b>0</b>	<b>156</b>		
22	workcounter, access 1 side	wca8	34		2	0	0	68	w/storage over/under	
23	storage cabinet	scc3	22		1	0	0	22	office supplies	
24	photocopier, medium color	pc2	42		1	0	0	42		
25	shredder	se	12		1	0	0	12		
26	waste receptable	se	12		1	0	0	12		
Subtotals				0	0	23	0	0	819	
Plus circulation factor (percent of nsf)			25%				0	0	205	
Total special area and equipment nsf							0	0	1,024	

# Municipal Court

Page 1 of 3

21 October 2020

Robert Hamilton, Judge

	space	std	FTEs/1000	popul	net	sq	ft/1,000	population	
	code	nsf	30.0	35.0	40.0	30.0	35.0	40.0	Comments
						<b>640</b>	<b>640</b>	<b>640</b>	
1 Judge	po3	160	1	1	1	160	160	160	
2 Court Administrator	po1	140	1	1	1	140	140	140	adjacent court
3 Lead Judicial Supt Spec	os3	80	1	1	1	80	80	80	adjacent court
4 Judicial Supt Specialist	os3	80	2	2	2	160	160	160	w/security station
5 PT Probation Counselor	po1	100	1	1	1	100	100	100	
Subtotals (personnel and nsf)			6	6	6	640	640	640	
Plus circulation factor (percent of nsf)		35%				224	224	224	
Total personnel nsf required						864	864	864	
Plus special areas and equipment nsf						3,772	4,140	4,469	
Total departmental nsf required						4,636	5,004	5,333	
Layout factor		0%				0	0	0	
<b>Total nsf required including layout</b>						<b>4,636</b>	<b>5,004</b>	<b>5,333</b>	
Area factor (nsf per person)						773	834	889	
Staff growth							0%	0%	
Space growth (nsf)							8%	7%	

		space code	std nsf	FTEs/1000 30.0	populnet 35.0	sq ft/1,000 population 40.0	30.0	35.0	40.0	Comments
<b>Equipment located out of office/workstation</b>							<b>0</b>	<b>0</b>	<b>0</b>	
1							0	0	0	
2							0	0	0	
3							0	0	0	
4							0	0	0	
5							0	0	0	
6							0	0	0	
7							0	0	0	
8							0	0	0	
9							0	0	0	
10							0	0	0	
<b>Common work area</b>							<b>307</b>	<b>307</b>	<b>307</b>	
11	workcounter, access 1 side	wca8	34	1	1	1	34	34	34	storage over/under
12	storage cabinet	scc3	22	1	1	1	22	22	22	supplies
13	photocopier, large	pc3	172	1	1	1	172	172	172	
14	printer	psa2	26	1	1	1	26	26	26	
15	shredder	se	12	1	1	1	12	12	12	
16	coffee station	kec1	41	1	1	1	41	41	41	
<b>Public counter</b>							<b>412</b>	<b>476</b>	<b>506</b>	
17	workcounter, access 2 sides	wcb8	34	1	2	2	34	68	68	w/terminals/storage und
18	workcounter, access 2 sides	wcb8	34	1	1	1	34	34	34	ADA/kiosk self-help
19	photocopier, small	pc1	30	1	1	1	30	30	30	adj/counter
20	printer	psa2	26	1	1	1	26	26	26	adj/counter
21	scanner	se	12	1	1	1	12	12	12	adj/counter
22	fax	se	12	1	1	1	12	12	12	adj/counter
23	counter queing/seating	each	15	6	8	10	90	120	150	peak
24	workcounter, access 1 side	wca8	34	1	1	1	34	34	34	public to fill out forms
25	counter conference room	cr3	140	1	1	1	140	140	140	adj/counter w/terminal
<b>Court lobby</b>							<b>504</b>	<b>576</b>	<b>648</b>	
26	security screening station	sa	24	1	1	1	24	24	24	
27	guard desk	os1	48	1	1	1	48	48	48	
28	lobby/reception	perso	12	30	36	42	360	432	504	w/seating
29	information racks	se	12	2	2	2	24	24	24	
30	childrens' play area	sa	48	1	1	1	48	48	48	close to courtroom
<b>Courtroom</b>							<b>1,338</b>	<b>1,518</b>	<b>1,698</b>	
31	courtroom	perso	15	60	72	84	900	1,080	1,260	w/video arraignment
32	witness holding room	cr1	100	1	1	1	100	100	100	
33	witness restroom - ADA	tl2	50	1	1	1	50	50	50	
34	prosecutors office/conference	cr3a	144	2	2	2	288	288	288	adjacent courtroom
<b>Jury room</b>							<b>331</b>	<b>331</b>	<b>331</b>	
35	jury selection room	sr	0	1	1	1	0	0	0	use hearing room
36	jury deliberation room	cr5	240	1	1	1	240	240	240	12 person
37	jury restroom - ADA	tl2	50	1	1	1	50	50	50	
38	jury coffee station	kec1	41	1	1	1	41	41	41	
<b>Holding areas</b>							<b>366</b>	<b>366</b>	<b>366</b>	
39	queing area	perso	12	6	6	6	72	72	72	
40	plaintiff restroom - ADA	tl2	50	1	1	1	50	50	50	adj/holding/secure
41	defense lawyer conference	cr3a	144	1	1	1	144	144	144	adjacent court/holding a
42	probation conference	cr1	100	1	1	1	100	100	100	
<b>Archives</b>							<b>22</b>	<b>26</b>	<b>30</b>	
43	industrial racks - boxes	se	0.4	24	28	32	10	11	13	closed files
44	industrial racks - boxes	se	0.4	12	14	16	5	6	6	daily reports and parking
45	industrial racks - boxes	se	0.4	8	10	12	3	4	5	misc court records
46	industrial racks - boxes	se	0.4	12	14	16	5	6	6	accounts
Subtotals			188	219	249		3,280	3,600	3,886	
Plus circulation factor (percent of nsf)			15%				492	540	583	
Total special area and equipment nsf							3,772	4,140	4,469	

1 October 2020

Lawrence Ellis, Director

	space code	nsf	std FTEs/1000 30.0	populat 35.0	net sq ft/1,000 40.0	30.0	35.0	40.0	Comments
<b>Administration</b>						<b>340</b>	<b>340</b>	<b>460</b>	
1	PCPS Director	po2	140	1	1	1	140	140	
2	Human Services Coordinator	po1	120	1	1	2	120	120	
3	Administrative Assistant 3	os3	80	1	1	1	80	80	
<b>Parks Operations</b>						<b>120</b>	<b>120</b>	<b>120</b>	
4	Parks Projects/Operations Manager	po1	120	1	1	1	120	120	at City Hall
<b>Facilities</b>						<b>120</b>	<b>120</b>	<b>120</b>	
5	Facilities Manager	po1	120	1	1	1	120	120	at City Hall
6	Maintenance Worker 2	niws		1	1	2	0	0	at City Hall
Subtotals (personnel and nsf)			6	6	8	580	580	700	
Plus circulation factor (percent of nsf)			35%			203	203	245	
Total personnel nsf required						783	783	945	
Plus special areas and equipment nsf						814	814	814	
Total departmental nsf required						1,597	1,597	1,759	
Layout factor			0%			0	0	0	
<b>Total nsf required including layout</b>						<b>1,597</b>	<b>1,597</b>	<b>1,759</b>	
Area factor (nsf per person)						266	266	220	
Staff growth rate vs previous year							0%	33%	
Space growth rate vs previous year							0%	10%	

	space code	nsf	std FTEs/1000 30.0	populat 35.0	net sq ft/1,000 40.0	30.0	35.0	40.0	Comments
<b>Equipment out of office/workstation</b>						<b>0</b>	<b>0</b>	<b>0</b>	
1						0	0	0	
2						0	0	0	
3						0	0	0	
4						0	0	0	
5						0	0	0	
<b>Lobby</b>						<b>96</b>	<b>96</b>	<b>96</b>	
6	information rack	se	12	2	2	2	24	24	programs
7	bulletin/map board	se	24	1	1	1	24	24	trails and parks
8	display boards	sa	24	2	2	2	48	48	project proposals
<b>Public counter and conference</b>						<b>173</b>	<b>173</b>	<b>173</b>	
9	counter queuing area	person	15	4	4	4	60	60	
10	conference room, 8 person	cr3a	144	0	0	0	0	0	share w/counter
11	conference room, 12 person	cr5	240	0	0	0	0	0	see common areas
12	conference room, 20 person	person	20	0	0	0	0	0	use Council sessions room
13	workcounter, access 2 sides	wcb8	34	1	1	1	34	34	
14	computer terminals	cta1	24	1	1	1	24	24	
15	printer, laser	psa1	13	1	1	1	13	13	
16	photocopier, medium	pc2	42	1	1	1	42	42	
<b>Reference area</b>						<b>76</b>	<b>76</b>	<b>76</b>	
17	bookcases, 5-6 shelves	bcc5	16	1	1	1	16	16	
18	storage cabinet	scc3	22	1	1	1	22	22	
19	worktable, access 2 sides	wta5	38	1	1	1	38	38	
<b>Graphics - share with Planning/Public Works</b>						<b>306</b>	<b>306</b>	<b>306</b>	
20	whiteline printer	se	30	0	0	0	0	0	
21	flat files	mia1	36	1	1	1	36	36	
22	plan bins	se	12	2	2	2	24	24	
23	hanging files	mic1	18	1	1	1	18	18	
24	photocopier, large w/base	pc3	172	1	1	1	172	172	
25	layout table	stb3	68	0	0	0	0	0	use Planning/Public Works
26	light table	stc1	22	0	0	0	0	0	use Planning/Public Works
27	workcounter, access 1 side	wca8	34	1	1	1	34	34	w/storage over/under
28	storage cabinet	scc3	22	1	1	1	22	22	
<b>Common work area - share</b>						<b>0</b>	<b>0</b>	<b>0</b>	
29	workcounter, access 1 side	wca8	34	0	0	0	0	0	storage over/under
30	storage cabinet	scc3	22	0	0	0	0	0	supplies
31	photocopier, medium	pc2	42	0	0	0	0	0	
32	shredder	se	12	0	0	0	0	0	
33	disposal bin	se	12	0	0	0	0	0	
<b>Shared areas = see common/support file</b>						<b>0</b>	<b>0</b>	<b>0</b>	
34	archives/storage	box	0.5				0	0	see common area
35	mud room	sa					0	0	see common area
36	equipment cage	sa					0	0	see common area
Subtotals			23	23	23	651	651	651	
Plus circulation factor (percent of nsf)			25%			163	163	163	
<b>Total special area and equipment nsf</b>						<b>814</b>	<b>814</b>	<b>814</b>	

March 2021



# Police

Page 1 of 2

21 October 2020

Carl Cole, Police Chief

206-973-4900

	space code	std nsf	FTEs/1000 30.0	populati 35.0	net sq ft/ 40.0	sq ft/1,000 30.0	population 35.0	40.0	Comments
<b>Office of the Chief</b>						<b>380</b>	<b>1,020</b>	<b>1,020</b>	
1 Police Chief	po3	160	1	1	1	160	160	160	
2 Assistant to the Chief - Admin	os3	80	1	1	1	80	80	80	
3 Deputy Chief of Police	po2	140	1	1	1	140	140	140	
4 Operations Commander	po2	140	0	1	1	0	140	140	
5 Investigations Commander	po2	140	0	1	1	0	140	140	
6 Special Operations Commander	po2	140	0	1	1	0	140	140	
7 Operations Manager	po2	140	0	1	1	0	140	140	
8 PIO/Recruiter	os3	80	0	1	1	0	80	80	
<b>Patrol Operations</b>						<b>480</b>	<b>840</b>	<b>1,080</b>	
9 Patrol Sergeants	po1	120	4	6	8	480	720	960	
10 Patrol Officers	niws		29	32	46	0	0	0	
11 Traffic Sergeant	po1	120	0	1	1	0	120	120	
12 Traffic Officers	niws		0	5	6	0	0	0	
<b>Investigations</b>						<b>880</b>	<b>1,680</b>	<b>1,840</b>	
13 Detective Sergeants	po1	120	2	4	4	240	480	480	
14 Detectives - CID	os3	80	3	4	5	240	320	400	
15 Detectives - Street Crimes	os3	80	3	4	5	240	320	400	
16 Detectives - Major Crimes	os3	80	1	4	4	80	320	320	
17 Detectives - Administrative	os3	80	0	2	2	0	160	160	
18 School Resource Officer	os3	80	1	1	1	80	80	80	
<b>Administrative Support</b>						<b>160</b>	<b>1,160</b>	<b>1,400</b>	
19 Records Supervisor	po2	140	0	1	1	0	140	140	
20 Administrative Assistant	os3	80	0	3	3	0	240	240	
21 Records Specialist	os3	80	0	6	9	0	480	720	
22 Evidence Technician	niws		0	1	1	0	0	0	in evidence processing
23 Community Service Officer	os3	80	2	1	1	160	80	80	
24 Computer Resource Specialist	po2	140	0	1	1	0	140	140	
25 Crime Analyst	os3	80	0	1	1	0	80	80	
Subtotals (personnel and nsf)			48	85	107	1,900	4,700	5,340	
Plus circulation factor (percent of nsf)		35%				665	1,645	1,869	
Total personnel nsf required						2,565	6,345	7,209	
Plus special areas and equipment nsf						13,916	16,383	18,756	
Total departmental nsf required						16,481	22,728	25,965	
Layout factor		0%				0	0	0	
<b>Total nsf required including layout</b>						<b>16,481</b>	<b>22,728</b>	<b>25,965</b>	
Area factor (nsf per person)						343	267	243	
Staff growth							77%	0.25882	
Space growth (nsf)							38%	14%	

	space code	std FTEs/1000 populati nsf	30.0	35.0	40.0	net sq ft/1,000 population 30.0	35.0	40.0	Comments
<b>Lobby/public counter</b>						<b>720</b>	<b>720</b>	<b>720</b>	
1	workcounter, access 2 sides	wcb8	34	2	2	2	68	68	68 public counter/reception
2	workcounter, access 2 sides	wcb8	34	1	1	1	34	34	34 ADA/passport
3	workcounter, access 1 side	wca1	14	1	1	1	14	14	14 accident reports-public
4	fingerprint/photo	se	24	1	1	1	24	24	24 on counter
5	drug take-back	se	12	1	1	1	12	12	12 adjacent counter
6	passport photo	sa	48	1	1	1	48	48	48 adjacent counter
7	information racks	se	12	1	1	1	12	12	12
8	display case	se	24	1	1	1	24	24	24 wall mounted
9	lobby queuing area	each	12	12	12	12	144	144	144
10	childrens play area	ca1	60	1	1	1	60	60	60
11	public interview room	cr2	140	2	2	2	280	280	280
<b>Administration</b>						<b>588</b>	<b>588</b>	<b>588</b>	
11	reception area, 4 person	ra2	108	1	1	1	108	108	108 adj/Chief
12	conference room, 24 person	cr6	480	1	1	1	480	480	480 adj/Chief
<b>Copy/reproduction</b>						<b>352</b>	<b>352</b>	<b>352</b>	
13	photocopier, large w/base	pco3	172	1	1	1	172	172	172
14	photocopier, color medium w/base	pco2	42	1	1	1	42	42	42
15	shredder	se	15	1	1	1	15	15	15
16	controlled document disposal	se	15	1	1	1	15	15	15
17	waste disposal	sa	12	1	1	1	12	12	12
18	workcounter, access 1 side	wca6	24	2	2	2	48	48	48 w/storage over/under
19	paper/form/supply storage	sca1	16	3	3	3	48	48	48
<b>Records storage</b>						<b>406</b>	<b>480</b>	<b>554</b>	
20	bookcase, 4 shelves	bcc4	16	12	14	16	192	224	256 current year files - 3 yrs
21	file cabinet, 4 dwr ltrl	fld4	10	6	8	10	60	80	100 storage
22	archive storage shelves	isb2	11	14	16	18	154	176	198 separate/secure
<b>Locker facilities</b>						<b>2,656</b>	<b>3,265</b>	<b>3,774</b>	<b>75% male, 25% female</b>
23	restrooms	sa	50	8	10	12	400	500	600 peak patrol shift
24	showers	sa	29	4	5	6	116	145	174 peak patrol shift
25	lockers - all uniform on-site	sa	20	47	71	90	940	1,420	1,800 uniformed officers
26	indoor training room - fitness	sr	60	10	10	10	600	600	600
27	indoor gym facility	sr	60	10	10	10	600	600	600
<b>Police break room</b>						<b>279</b>	<b>328</b>	<b>367</b>	
28	kitchenette	ked1	77	1	1	1	77	77	77
29	refrigerator	se	18	1	1	1	18	18	18
30	table seating	each	12	12	14	16	144	168	192
31	bookcase, 4 shelves	bca4	10	1	2	2	10	20	20
32	vending machine	kee1	15	2	3	4	30	45	60
<b>Report writing workstations</b>						<b>641</b>	<b>743</b>	<b>987</b>	
33	report writing workstations	os1	46	10	11	15.3	445	491	705 each shift patrol officer
34	file cabinet, 2/4 dwr vert	fva2	0	10	10.7	15.3	0	0	0 in each workstation
35	mail slots	se	30	4	5	6	120	150	180 w/report writing
36	printer stand w/rack	psa2	26	2	3	3	52	78	78
37	bulletin board	sa	24	1	1	1	24	24	24
<b>Roll call/briefing room</b>						<b>722</b>	<b>938</b>	<b>1,152</b>	<b>smart room</b>
38	bulletin board/monitor	sa	24	1		1	24	0	24
39	rollcall room - persons	each	10	47	71	90	470	710	900
40	bookcase, 4 shelves	bcb4	20	2	2	2	40	40	40 in roll call room
41	storage cabinet, w/shelves 2 door	sca3	15	4	4	4	60	60	60 in roll call room, eqpmnt
42	audio-visual equipment	sa	64	2	2	2	128	128	128 lecturn/equipment storage
<b>Evidence processing</b>						<b>1,069</b>	<b>1,184</b>	<b>1,299</b>	
43	pass-through lockers	each	20	8	10	12	160	200	240 adjacent pass-through locker:
44	evidence locker	se	12	8	10	12	96	120	144 pass through lockers
45	breakdown area	sa	90	1	1	1	90	90	90
46	workcounter, access 2 side	wcb8	34	2	2	2	68	68	68 writing evidence log
47	workstation w/computer	os3	80	1	1	1	80	80	80 Evidence Technician
48	file cabinet, 4 dwr ltrl	flb4	12	2	3	4	24	36	48
49	storage cabinet, w/shelves 2 door	sca3	15	4	5	6	60	75	90 w/evidence processing
50	operations crime scene storage	sa	90	1	1	1	90	90	90 break down area
51	industrial storage, open	isa3	12	4	5	6	48	60	72 evidence drying
52	freezer unit	se	20	2	2	2	40	40	40
52	refrigerator	se	18	1	1	1	18	18	18

53	industrial shelving, open	isa3	12	2	3	4	24	36	48	open cases
54	weapons locker	se	24	2	2	2	48	48	48	
55	money/narcotics locker	sr	144	1	1	1	144	144	144	HEPA filters
56	toilet - ADA-shower	tl3	79	1	1	1	79	79	79	hazardous wash
<b>Weapons/ammo/radio room</b>							<b>222</b>	<b>222</b>	<b>258</b>	
57	weapons racks	se	12	2	2	3	24	24	36	
58	ammunition locker	sca2	24	2	2	3	48	48	72	
59	training cabinet	sca2	24	2	2	2	48	48	48	
60	workcounter, access 1 side	wca8	34	3	3	3	102	102	102	weapons/radio workbench
<b>Riot/tactical equipment</b>							<b>428</b>	<b>455</b>	<b>498</b>	
61	riot gear	sa	90	2	2	2	180	180	180	
62	tactical locker	sca3	16	3	3	4	48	48	64	
63	workcounter, access 1 side	wca8	34	2	2	2	68	68	68	equipment preparation
64	storage cabinet, w/shelves 2 door	sca3	15	4	5	6	60	75	90	
65	industrial shelving, open	isa3	12	2	3	4	24	36	48	
66	floor space	sa	24	2	2	2	48	48	48	
<b>Processing/booking</b>							<b>182</b>	<b>182</b>	<b>182</b>	
67	breathalyzer	sa	24	1	1	1	24	24	24	
68	mug photo	sa	24	1	1	1	24	24	24	
69	fingerprint	sa	24	1	1	1	24	24	24	
70	storage cabinet	sca1	16	2	2	2	32	32	32	
71	workcounter/desk	wca8	39	2	2	2	78	78	78	storage over/under
<b>Investigations</b>							<b>344</b>	<b>444</b>	<b>444</b>	
72	interogation w/viewing/computers	sr	100	1	2	2	100	200	200	adj/detectives
73	interview room - small/computers	sr	100	1	1	1	100	100	100	adj/detectives
74	interview room - family/computers	sr	144	1	1	1	144	144	144	adj/detectives
<b>Holding cells-under 6 hr interviews</b>							<b>301</b>	<b>301</b>	<b>301</b>	
75	holding cell	prsn	64	3	3	3	192	192	192	w/acoustics/wash down
76	toilet w/shower	tl2	79	1	1	1	79	79	79	
77	storage cabinet, w/shelves 2 door	sca3	15	2	2	2	30	30	30	w/holding cells
<b>Sallyport</b>							<b>1,291</b>	<b>1,419</b>	<b>1,483</b>	
78	vehicle arrival area, secure	se	600	2	2	2	1,200	1,200	1,200	adj/holding cells
79	decontamination shower	tl3	79	1	1	1	79	79	79	adj/sallyport
80	K-9 kennel	sa	64	0	2	3	0	128	192	in sallyport
81	explosives storage locker	se	12	1	1	1	12	12	12	in sallyport
<b>Storage building/space</b>							<b>1,900</b>	<b>2,625</b>	<b>3,350</b>	
82	transient property storage	sr	100	8	9	10	800	900	1,000	auction items in cage
83	bicycle storage	sr	25	8	9	10	200	225	250	Public Works Yard
84	covered vehicle impound	bay	300	1	2	3	300	600	900	Public Works Yard
85	uncovered vehicle impound	bay	300	1	2	3	300	600	900	Public Works Yard
86	secured vehilce storage	bay	300	1	1	1	300	300	300	Public Works Yard
<b>Subtotals</b>			<b>349</b>	<b>430</b>	<b>510</b>		<b>12,101</b>	<b>14,246</b>	<b>16,309</b>	
<b>Plus circulation factor (percent of nsf)</b>			<b>15%</b>				<b>1,815</b>	<b>2,137</b>	<b>2,446</b>	
<b>Total special area and equipment nsf</b>							<b>13,916</b>	<b>16,383</b>	<b>18,756</b>	

# Public Works Department- City Hall

Page 1 of 2

21 September 2020

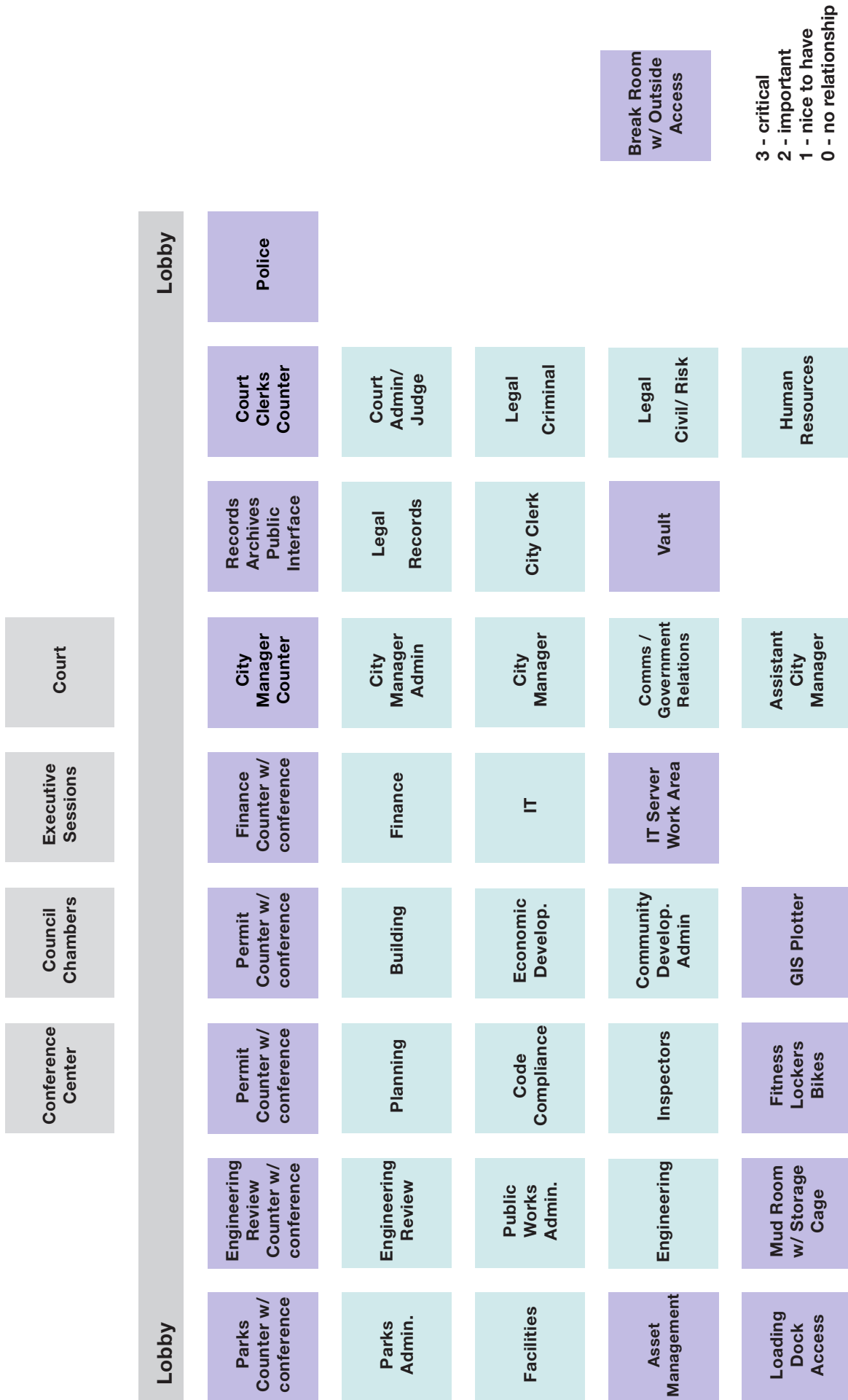
Will Appleton, Director

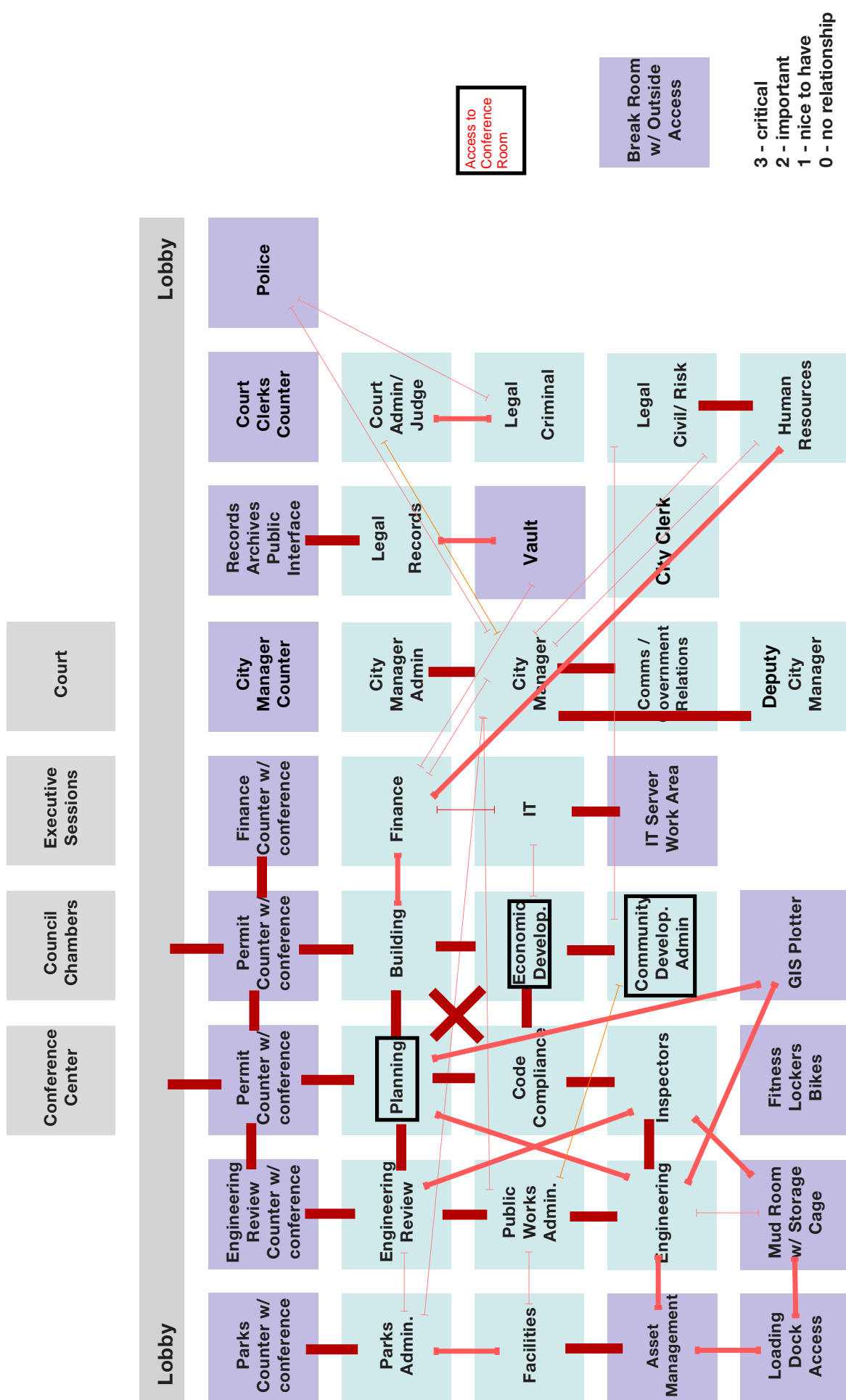
		space code	std nsf	FTEs/1000 30.0	popula 35.0	net sq ft/ 40.0	1,000 population 30.0	35.0	40.0	Comments
Public Works							260	340	340	
1	Public Works Director	po3	160	1	1	1	160	160	160	access conference 6
2	Public Works Prgm Coordinator	os4	100	1	1	1	100	100	100	
3	Intern - Solid Waste	os3	80	0	1	1	0	80	80	part-time/summer hire
4	Administrative Assistant 3	os3	80	1	1	1	80	80	80	
5	Administrative Assistant 2	os3	80	1	1	1	80	80	80	
6	Emergency Mgt Coordinator	os3	80	1	1	1	80	80	80	space provided by PSRF
Engineering							1,160	1,340	1,540	
7	City Engineer	po2	140	1	1	1	140	140	140	access conference 4
8	Public Works Inspection Spvr	po1	120	1	1	1	120	120	120	access conference 2
9	Engineering Manager	po1	120	1	1	1	120	120	120	access conference 4
10	Traffic Engineer	po1	120	0	0	1	0	0	120	
11	Intern - Engineering	os3	80	0	1	1	0	80	80	
12	Asset Mgt Coordinator	os3	80	1	1	2	80	80	160	
13	Real Estate Specialist	os3	80	1	1	1	80	80	80	
14	Civil Engineer I/II	os4	100	3	4	4	300	400	400	
15	PW Inspector Jr/Sr	os3	80	4	4	4	320	320	320	
Engineering Review							600	600	400	
16	Engineering Review Manager	po1	120	1	1	1	120	120	120	
17	Civil Engineer I/II	os4	100	2	2	2	200	200	200	
18	Civil Engineer I - Sound Transit	os4	100	1	1	0	100	100	0	
19	Civil Engineer II - Sound Liason	os4	100	1	1	0	100	100	0	
20	PW Inspector Jr/Sr	os3	80	1	1	1	80	80	80	
Subtotals (personnel and nsf)				23	26	26	2,020	2,280	2,280	
Plus circulation factor (percent of nsf)			35%				707	798	798	
Total personnel nsf required							2,727	3,078	3,078	
Plus special areas and equipment nsf							625	735	735	
Total departmental nsf required							3,352	3,813	3,813	
Layout factor			0%				0	0	0	
Total nsf required including layout							3,352	3,813	3,813	
Area factor (nsf per person)							146	147	147	
Staff growth								13%	0%	
Space growth (nsf)								14%	0%	

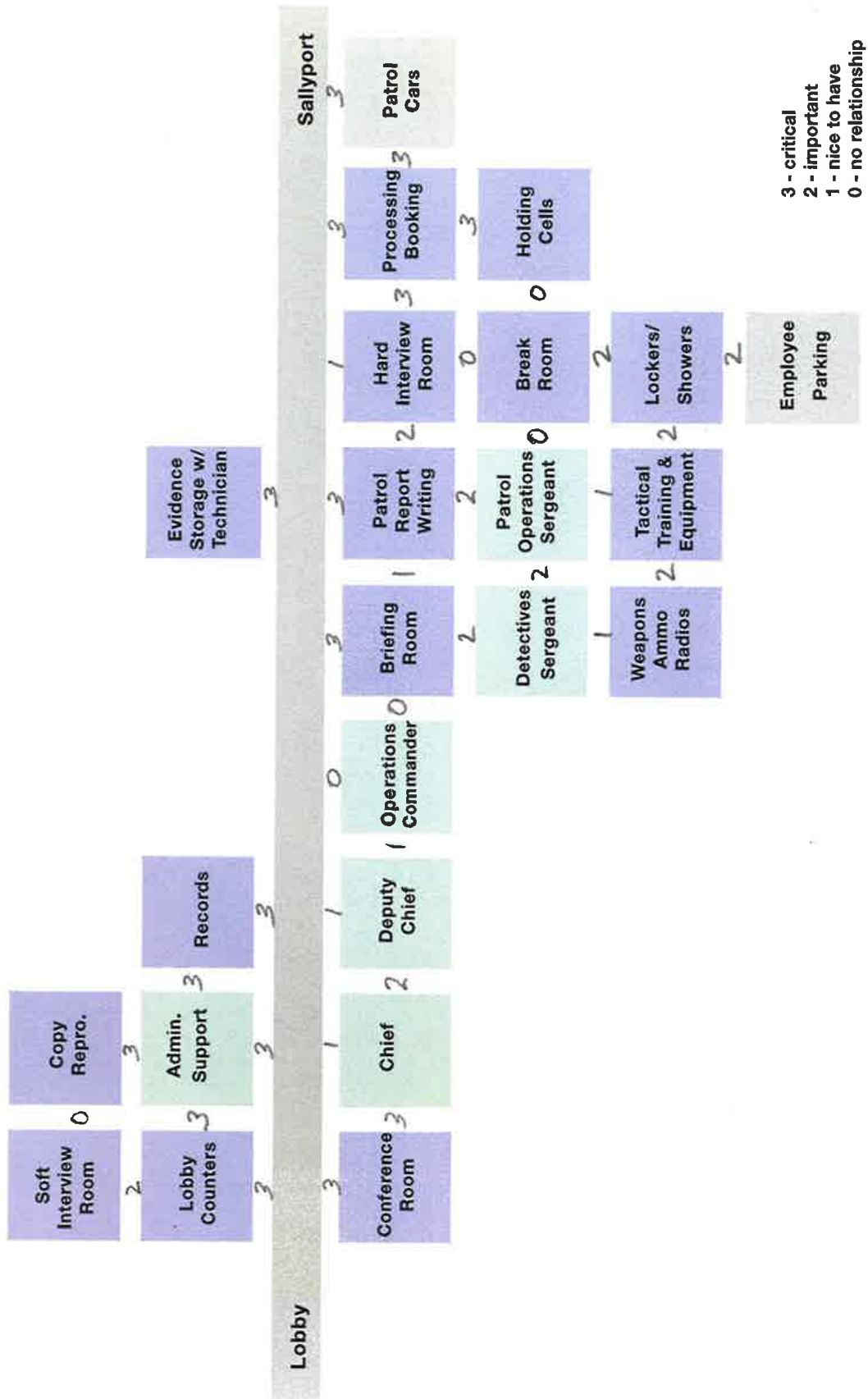
	space code	nsf	std FTEs/1000 population			net sq ft/1,000 population			Comments
		30.0	35.0	40.0		30.0	35.0	40.0	
<b>Equipment out off office/workstation</b>						<b>0</b>	<b>0</b>	<b>0</b>	
1						0	0	0	
2						0	0	0	
3						0	0	0	
4						0	0	0	
5						0	0	0	
6						0	0	0	
7						0	0	0	
8						0	0	0	
9						0	0	0	
10						0	0	0	
11						0	0	0	
12						0	0	0	
<b>Public counter and conference</b>						<b>120</b>	<b>120</b>	<b>120</b>	
13	customer queuing - 4 person	ra2	108	1	1	1	108	108	108 w/monitors/printer
14	workcounter, access 2 sides	wcb8	0	1	1	1	0	0	0 w/monitors/printer
15	conference room, 6 person	cr2	0	1	1	1	0	0	0
16	information racks	se	12	1	1	1	12	12	12
17	conference room, 12 person	cr5	0				0	0	0 see Common File
<b>Common work area</b>						<b>206</b>	<b>240</b>	<b>240</b>	
18	workcounter, access 1 side	wca8	34	2	2	2	68	68	68 w/storage over/under
19	storage cabinet	scc3	22	1	2	2	22	44	44 supplies
20	photocopier, medium - color	pc2	24	1	1	1	24	24	24
21	printer, black and white	pc2	42	1	1	1	42	42	42
22	printer, color	psa2	26	1	1	1	26	26	26
23	shredder	se	12	1	1	1	12	12	12
24	waste receptacle	se	12	1	2	2	12	24	24
<b>Plotter room/area</b>						<b>174</b>	<b>228</b>	<b>228</b>	
25	scanner	se	42	1	1	1	42	42	42
26	plotter	se	42	1	1	1	42	42	42
27	hanging files	mic1	18	3	4	4	54	72	72
28	flat files - 5 drawers stacked	mia1	36	1	2	2	36	72	72 layout area
29	paper cutter	se	0	1	1	1	0	0	0
<b>Storage room - see common file</b>						<b>0</b>	<b>0</b>	<b>0</b>	
30	industrial shelving, open boxes	box	0.5				0	0	0
31	industrial shelving, open	isc3	16				0	0	0
32	plan bin	se	12				0	0	0
33	presentation boards	sa	12				0	0	0
<b>Subtotals</b>			<b>12</b>	<b>14</b>	<b>14</b>	<b>500</b>	<b>588</b>	<b>588</b>	
<b>Plus circulation factor (percent of nsf)</b>			<b>25%</b>			<b>125</b>	<b>147</b>	<b>147</b>	
<b>Total special area and equipment nsf</b>						<b>625</b>	<b>735</b>	<b>735</b>	



## *APPENDIX B*

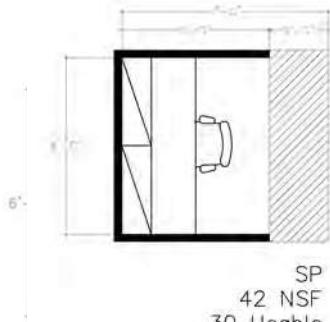
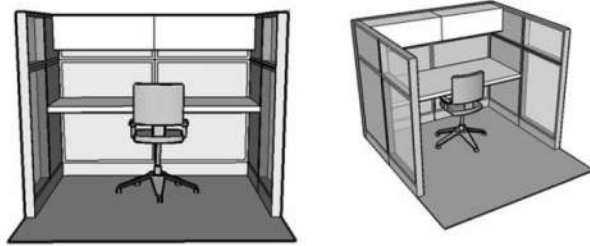




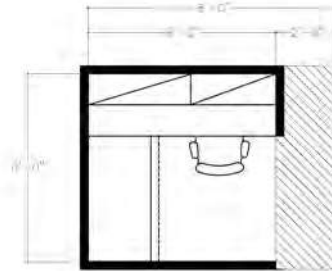
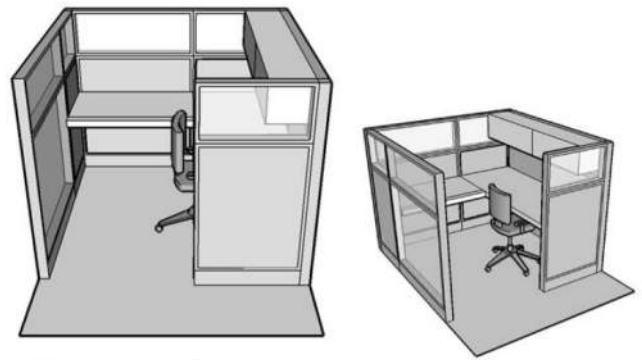


## *APPENDIX C*

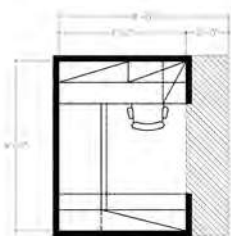
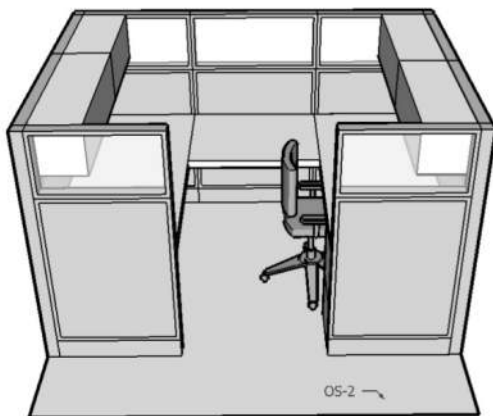




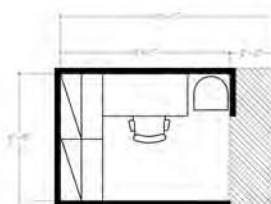
SP  
42 NSF  
30 Usable



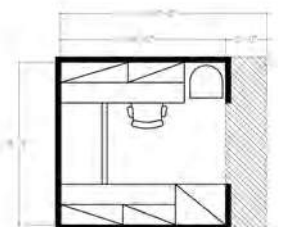
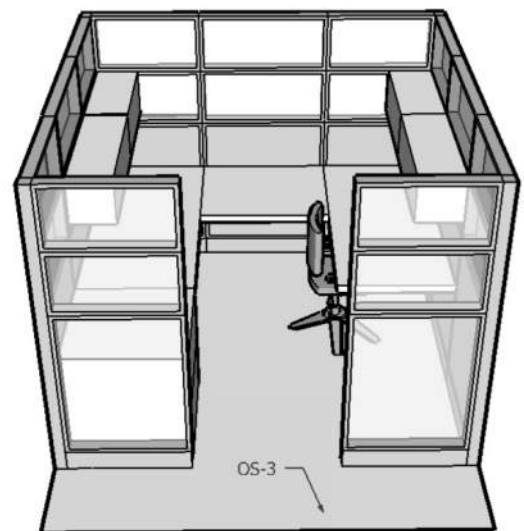
OS-1  
48 NSF  
36 Usable



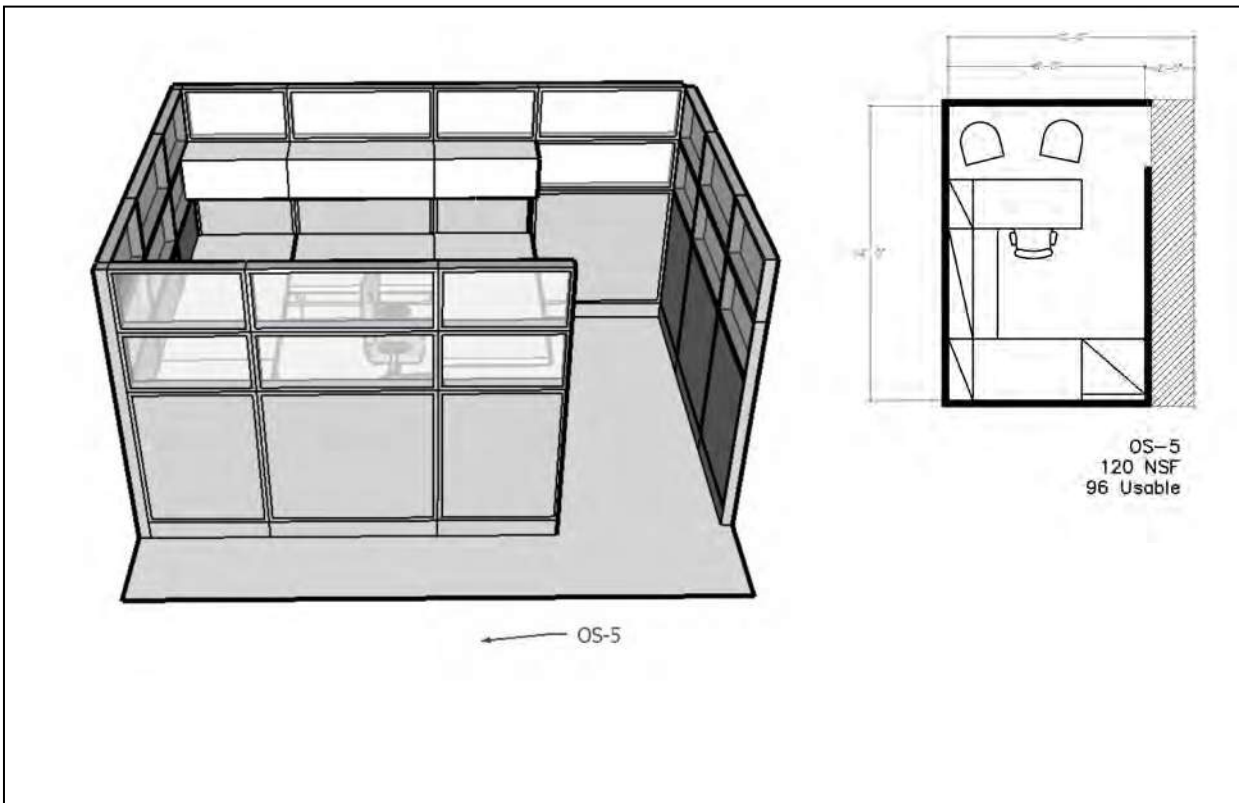
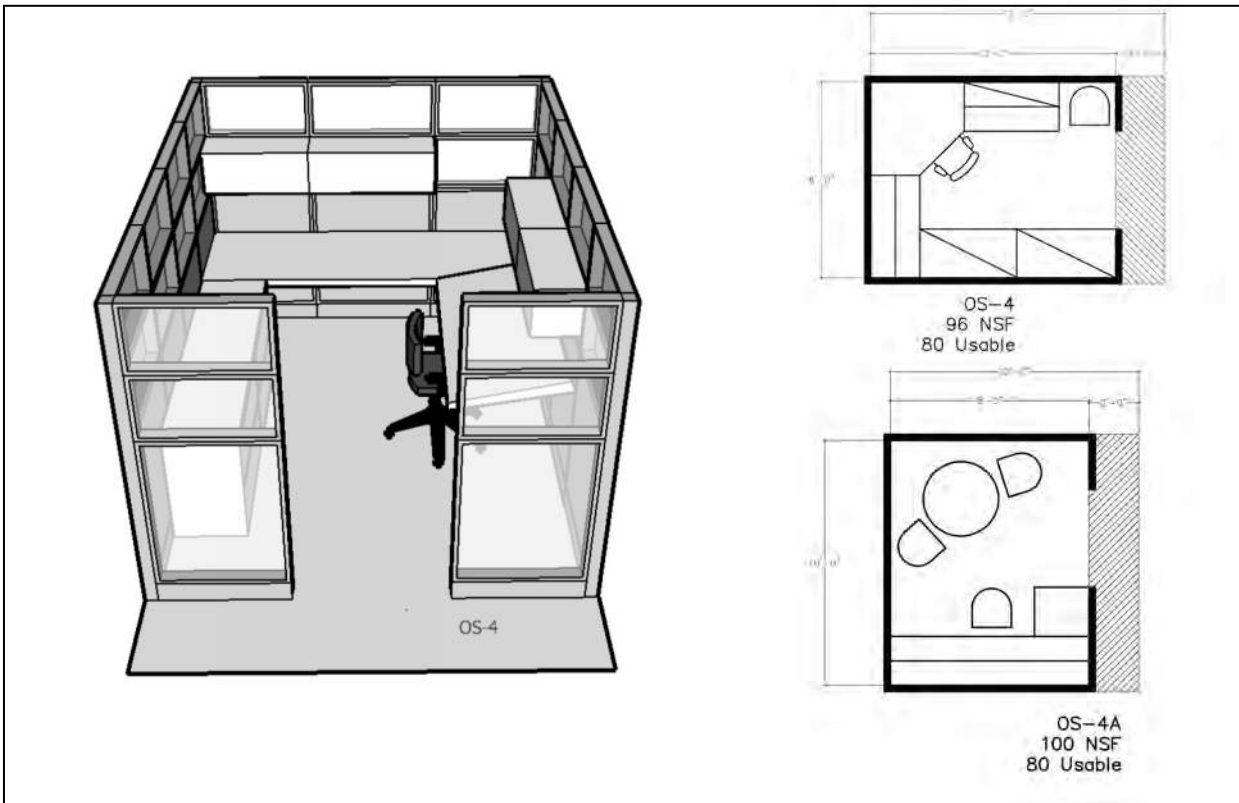
OS-2  
64 NSF  
46 Usable

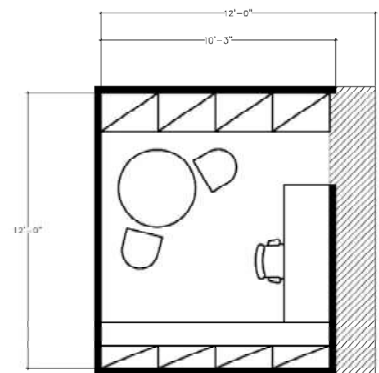
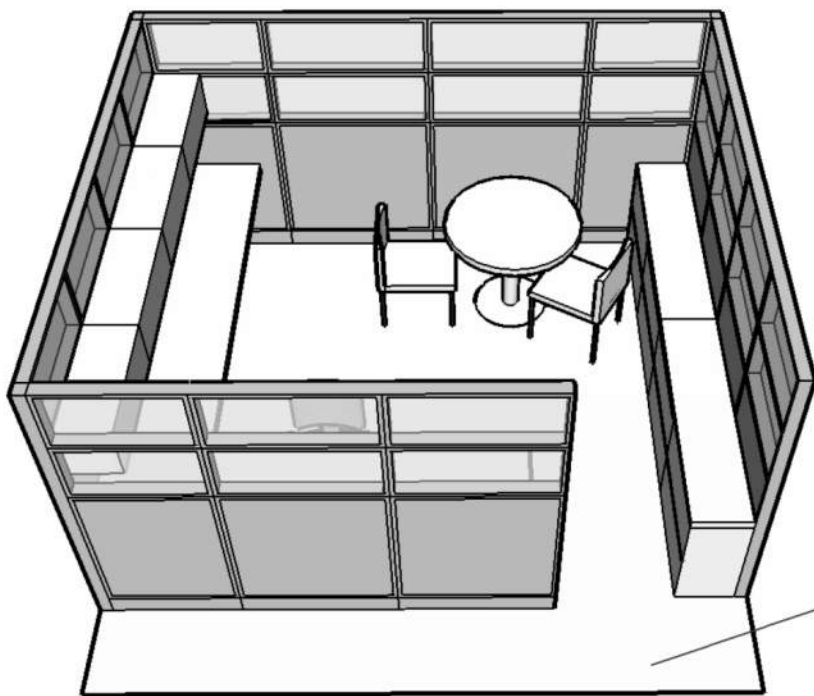


OS-2A  
60 NSF  
52 Usable



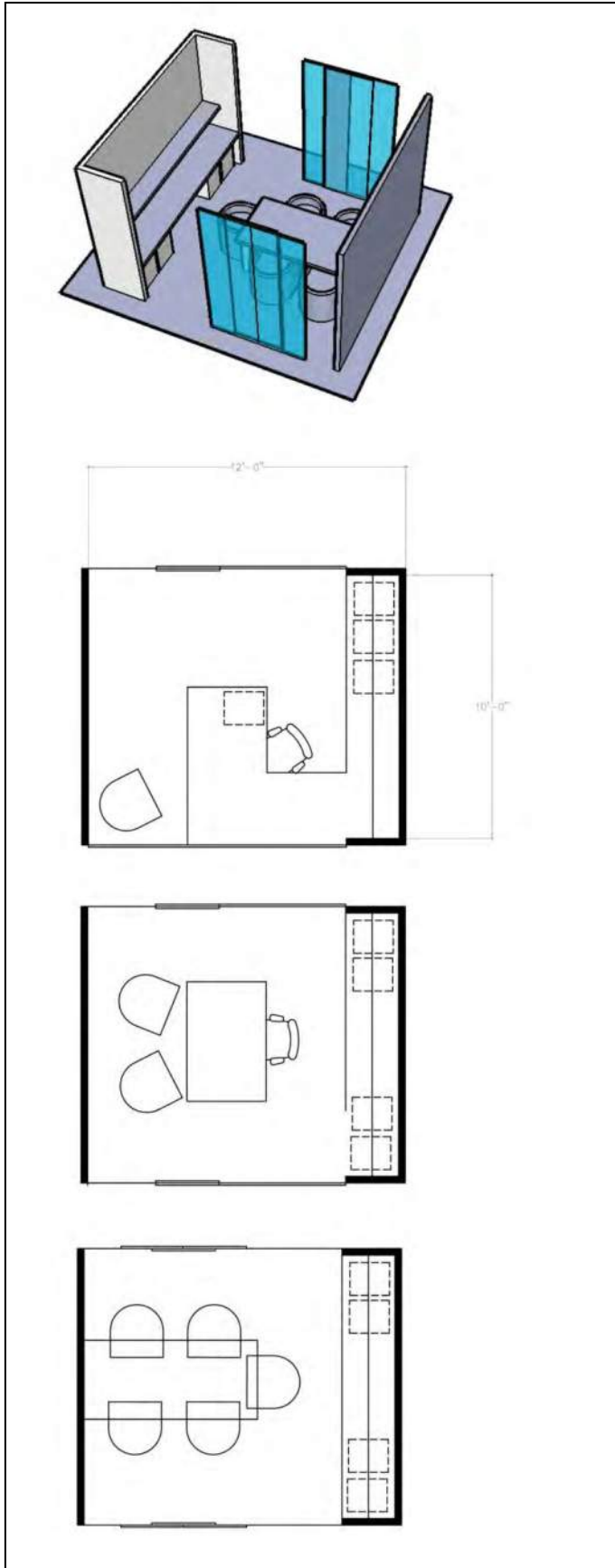
OS-3  
80 NSF  
64 Usable





OS-6  
144 NSF  
120 Usable

OS6



## PO1 - Private office 120 sf

Division manager or professional staff that require confidential interviews or reviews and/or frequent coordination within a general office environment.

### **Functional requirements:**

- Working environment allowing confidential meetings with up to 1-4 visitors or staff.
- That can be made visually and acoustically secure for work review meetings, planning sessions, and other team workshops.

### **Furnishing requirements:**

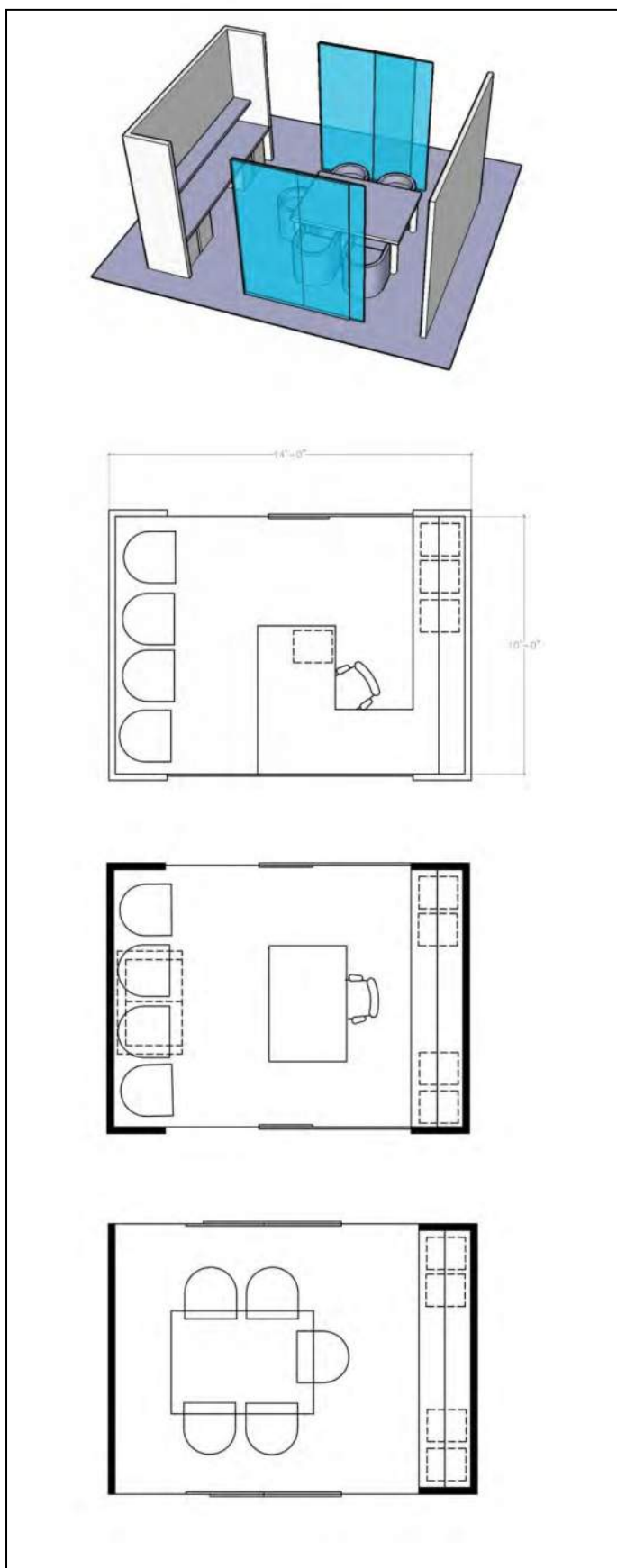
- Extended primary work surface that can support a computer terminal and printer with space for reports and other material layouts.
- Overhead shelving space for files and reference materials.
- Lockable file cabinets or drawers that may store confidential materials.
- Conferencing table with seating for up to 4 visitors.

### **Design considerations:**

- Office width laid-out in a 10 foot module to integrate into typical 8 to 10 foot open office floor plan.
- End walls may be gypsum wallboard up to 8 feet or to the height of the ceiling with integrated power and telecommunications service.
- End walls may be fitted with modular office components providing desktop surfaces, file and drawer cabinets under, and open or cabinet shelving.
- Side walls may be sliding double-pane glass panels or doors with incorporated blinds or frosted glass for privacy.

### **Specifications:**

Primary work surface	30"x10' desktop along end wall
Secondary work surface option	30"x30" desktop along side wall
Conference work surface	36"x60" desk/table or 48"x72" table
File cabinets or drawer units	2-drawer 28" letter vertical under desktop along end wall
Shelving or cabinets	2-3 each 12"-14" x10' over desktop and 3-5 each on opposite end wall
Seating	Conference chairs
Security	Panic button option in offices with public contact



## PO2 - Private office 140 sf

Department or division managers that require frequent coordination duties and/or supervisory responsibilities within a general office environment.

### **Functional requirements:**

- Working environment allowing confidential meetings with up to 2-4 staff for more than 5 hours per day.
- That can be made visually and acoustically secure for work review meetings, planning sessions, and other team workshops for more than 2 hours per day.

### **Furnishing requirements:**

- Extended primary work surface that can support a computer terminal and printer with space for reports and other material layouts.
- Overhead shelving space for files and reference materials.
- Lockable file cabinets or drawers that may store confidential materials.
- Conferencing table with seating for up to 4 visitors.

### **Design considerations:**

- Office width laid-out in a 10 foot module to integrate into typical 8 to 10 foot open office floor plan.
- End walls may be gypsum wallboard up to 8 feet or to the height of the ceiling with integrated power and telecommunications service.
- End walls may be fitted with modular office components providing desktop surfaces, file and drawer cabinets under, and open or cabinet shelving.
- Side walls may be sliding double-pane glass panels or doors with incorporated blinds or frosted glass for privacy.

### **Specifications:**

Primary work surface	30"x10' desktop along end wall
Secondary work surface option	30"x30" desktop along side wall
Conference work surface	36"x60" desk/table or 48"x60" table
File cabinets or drawer units	2-drawer 28" letter vertical under desktop along end wall
Shelving or cabinets	2-3 each 12"-14" x10' over desktop and 3-5 each on opposite end wall
Seating	Conference chair or couch option



### PO3 - Private office 160 sf

Department or division managers that require frequent coordination duties and/or supervisory responsibilities within a general office environment.

#### **Functional requirements:**

- Working environment allowing confidential meetings with up to 4 staff for more than 5 hours per day.
- That can be made visually and acoustically secure for work review meetings, planning sessions, and other team workshops for more than 2 hours per day.

#### **Furnishing requirements:**

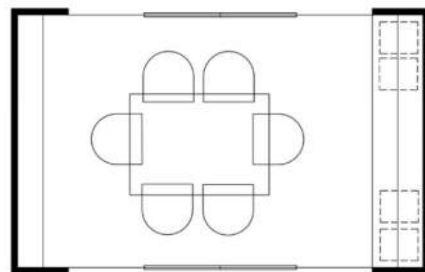
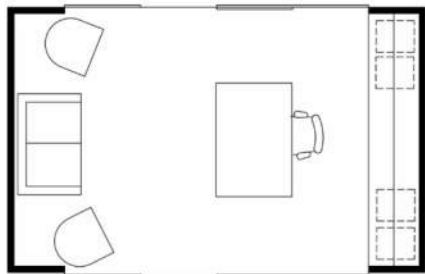
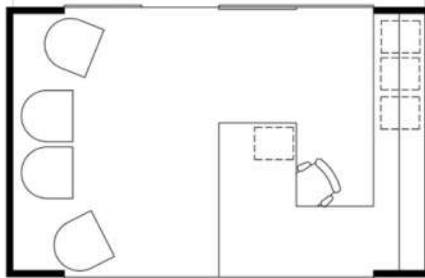
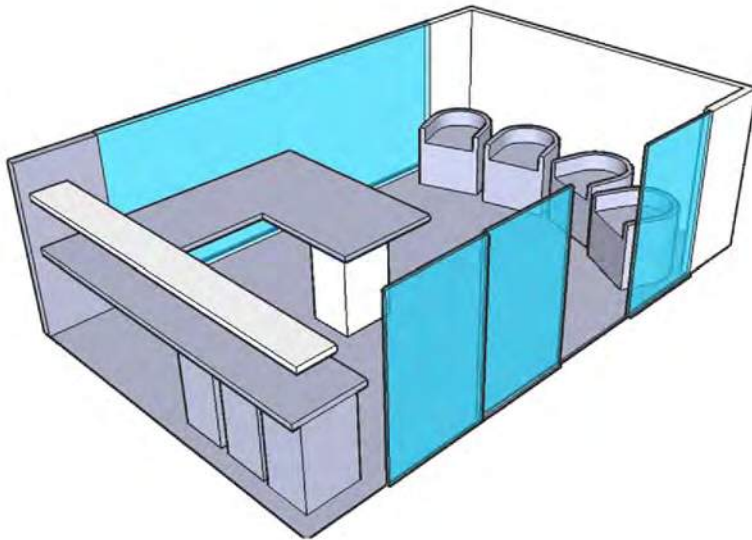
- Extended primary work surface that can support a computer terminal and printer with space for reports and other material layouts.
- Overhead shelving space for files and reference materials.
- Lockable file cabinets or drawers that may store confidential materials.
- Conferencing table with seating for up to 4-5 visitors.

#### **Design considerations:**

- Office width laid-out in a 10 foot module to integrate into typical 8 to 10 foot open office floor plan.
- End walls may be gypsum wallboard up to 8 feet or to the height of the ceiling with integrated power and telecommunications service.
- End walls may be fitted with modular office components providing desktop surfaces, file and drawer cabinets under, and open or cabinet shelving.
- Side walls may be sliding double-pane glass panels or doors with incorporated blinds or frosted glass for privacy.

#### **Specifications:**

Primary work surface	30"x10' desktop along end wall
Secondary work surface option	30"x30" desktop along side wall
Conference work surface	36"x60" desk/table or 48"x72" table
File cabinets or drawer units	2-drawer 28" letter vertical under desktop along end wall
Shelving or cabinets	2-3 each 12"-14" x10' over desktop and 3-5 each on opposite end wall
Seating	Conference chair or couch option



## Space standards/catalogue

code	description	usable			net dimensions		nsf
po1	private office - examiner/attorney				10'0" x 12'0"		120
po2	private office - manager				10'0" x 14'0"		140
po3	private office - director				10'0" x 16'0"		160
		usable			net		
cw1	computerized workstation - data compiler	6'3"	x	7'6"	6'3" x 9'6"		62
cw2	computerized workstation - computer inform	6'3"	x	8'9"	6'3" x 10'9"		72
cw3	computerized workstation - data processing	7'6"	x	8'9"	7'6" x 10'9"		83
cw4	computerized workstation - information syst	9'9"	x	8'9"	9'9" x 10'9"		105
		usable			net		
oc1	open conventional workstation	7'6"	x	5'0"	7'6" x 7'0"		53
oc2	open conventional workstation	7'6"	x	6'6"	7'6" x 8'6"		65
oc3	open conventional workstation	8'6"	x	9'6"	8'6" x 11'6"		97
oc4	open conventional workstation	9'0"	x	11'6"	9'0" x 13'6"		122
oc5	open conventional workstation	11'0"	x	10'0"	11'0" x 12'0"		132
oc6	open conventional workstation	13'0"	x	10'0"	13'0" x 12'0"		156
		usable			net		
sp1	open systems workstation	6'0"	x	5'0"	6'0" x 7'0"		42
os1	open systems workstation	6'0"	x	6'0"	6'0" x 8'0"		48
os2	open systems workstation	8'0"	x	6'0"	8'0" x 8'0"		64
os2a	open systems workstation	6'0"	x	8'0"	6'0" x 10'0"		60
os3	open systems workstation	8'0"	x	8'0"	8'0" x 10'0"		80
os4	open systems workstation	8'0"	x	10'0"	8'0" x 12'0"		96
os4a	open systems workstation	10'0"	x	8'0"	10'0" x 10'0"		100
os5	open systems workstation	12'0"	x	8'0"	12'0" x 10'0"		120
os6	open systems workstation	12'0"	x	10'0"	12'0" x 12'0"		144
sw2	open systems workstation - shared 2 person	12'0"	x	8'0"	12'0" x 10'0"		120
sw4	open systems workstation - shared 4 person	12'0"	x	14'0"	12'0" x 16'0"		192
ca1	conference area, 2 persons				6'0" x 10'0"		60
ca2	conference area, 4 persons				10'0" x 10'0"		100
ca3	conference area, 6 persons				10'0" x 14'0"		140
ca4	conference area, 8 persons				10'0" x 15'0"		150
cr1	conference room, 4 persons				10'0" x 10'0"		100
cr2	conference room, 6 persons				10'0" x 14'0"		140
cr3a	conference room, 8 persons				12'0" x 12'0"		144
cr3b	conference room, 8 persons				10'0" x 15'0"		150
cr4	conference room, 10 persons				14'0" x 16'0"		224
cr5	conference room, 12 persons				12'0" x 20'0"		240
ra1	reception area, 2 persons				7'0" x 9'0"		63
ra2	reception area, 4 persons				9'0" x 12'0"		108
ra3	reception area, 6 persons				12'0" x 12'0"		144
ra4	reception area, 8 persons				16'0" x 12'0"		192
ra5	reception area, 12 persons				19'0" x 16'0"		304
rr3	reception room, 6 persons				12'0" x 12'0"		144
rr4	reception room, 8 persons				16'0" x 12'0"		192
rr5	reception room, 12 persons				19'0" x 16'0"		304
bca2	bookcase, 2 shelves				36" x 15" x 30"		10
bca3	bookcase, 3 shelves				36" x 15" x 36"		10
bca4	bookcase, 4 shelves				36" x 15" x 48"		10
bc2	bookcase, 2 shelves				48" x 15" x 30"		13
bc3	bookcase, 3 shelves				48" x 15" x 36"		13
bc4	bookcase, 4 shelves				48" x 15" x 48"		13
bcc2	bookcase, 2 shelves				60" x 15" x 30"		16
bcc3	bookcase, 3 shelves				60" x 15" x 36"		16
bcc4	bookcase, 4 shelves				60" x 15" x 48"		16

cca1	card storage cabinet, 10 drawer				20" x 30" x 29"	12
ccb1	card storage cabinet, 20 drawer				20" x 30" x 52"	12
cta1	computer table, crt & keyboard				48" x 30" x 27"	24
ctb1	computer table, crt & keyboard				72" x 30" x 27"	36
dca1	data storage cabinet				36" x 18" x 36"	15
dca2	data storage cabinet				36" x 18" x 51"	15
dca3	data storage cabinet				36" x 18" x 67"	15
dca4	data storage cabinet				36" x 18" x 83"	15
dcb1	data storage cabinet				42" x 18" x 36"	18
dcb2	data storage cabinet				42" x 18" x 51"	18
dcb3	data storage cabinet				42" x 18" x 67"	18
dcb4	data storage cabinet				42" x 18" x 83"	18
dcc1	data storage cabinet				48" x 18" x 36"	20
dcc2	data storage cabinet				48" x 18" x 51"	20
dcc3	data storage cabinet				48" x 18" x 67"	20
dcc4	data storage cabinet				48" x 18" x 83"	20
dral	data storage rack, rolling				39" x 16" x 48"	15
drb1	shredded data rack, rolling				42" x 30" x 73"	9
mca1	microfiche storage cabinet, 10 drawer				20" x 30" x 29"	12
mcb1	microfiche storage cabinet, 20 drawer				20" x 30" x 52"	12
psa1	printer stand				30" x 30" x 29"	13
psa2	printer stand w/receiving rack				30" x 44" x 29"	26
psb1	printer stand				48" x 30" x 29"	20
psb2	printer stand w/receiving rack				48" x 44" x 29"	36
tca1	tape storage cabinet w/doors				30" x 14" x 36"	11
tca2	tape storage cabinet w/doors				30" x 14" x 51"	11
tca3	tape storage cabinet w/doors				30" x 14" x 67"	11
tca4	tape storage cabinet w/doors				30" x 14" x 83"	11
tcbl	tape storage cabinet w/doors				42" x 14" x 36"	13
tcbl	tape storage cabinet w/doors				42" x 14" x 51"	13
tcbl	tape storage cabinet w/doors				42" x 14" x 67"	13
tcbl	tape storage cabinet w/doors				42" x 14" x 83"	13
tcc1	tape storage cabinet w/doors				48" x 14" x 36"	15
tcc2	tape storage cabinet w/doors				48" x 14" x 51"	15
tcc3	tape storage cabinet w/doors				48" x 14" x 67"	15
tcc4	tape storage cabinet w/doors				48" x 14" x 83"	15
tra1	tape storage rack				36" x 14" x 73"	11
trb1	tape storage rack				42" x 14" x 73"	13
trc1	tape storage rack				48" x 14" x 73"	15
fla2	file cabinet, lateral 2 drawer				30" x 18" x 29"	10
fla3	file cabinet, lateral 3 drawer				30" x 18" x 42"	10
fla4	file cabinet, lateral 4 drawer				30" x 18" x 52"	10
fla5	file cabinet, lateral 5 drawer				30" x 18" x 60"	10
flb2	file cabinet, lateral 2 drawer				36" x 18" x 29"	12
flb3	file cabinet, lateral 3 drawer				36" x 18" x 42"	12
flb4	file cabinet, lateral 4 drawer				36" x 18" x 52"	12
flb5	file cabinet, lateral 5 drawer				36" x 18" x 60"	12
flc2	file cabinet, lateral 2 drawer				42" x 18" x 29"	14
flc3	file cabinet, lateral 3 drawer				42" x 18" x 42"	14
flc4	file cabinet, lateral 4 drawer				42" x 18" x 52"	14
flc5	file cabinet, lateral 5 drawer				42" x 18" x 60"	14
fld2	file cabinet, lateral 2 drawer				48" x 18" x 29"	16
fld3	file cabinet, lateral 3 drawer				48" x 18" x 42"	16
fld4	file cabinet, lateral 4 drawer				48" x 18" x 52"	16
fld5	file cabinet, lateral 5 drawer				48" x 18" x 60"	16
flsp	file cabinet, lateral special				see program	
foa1	file cabinet, open letter				36" x 12" x 80"	11
foa2	file cabinet, open letter				36" x 12" x 90"	11
foa3	file cabinet, open letter				48" x 12" x 80"	14
fao4	file cabinet, open letter				48" x 12" x 90"	14

fob1	file cabinet, open legal				36" x 15" x 80"	12
fob2	file cabinet, open legal				36" x 15" x 90"	12
fob3	file cabinet, open legal				48" x 15" x 80"	15
fob4	file cabinet, open legal				48" x 15" x 90"	15
fva2	file cabinet, vertical 2 drawer/letter				15" x 28" x 29"	8
fva3	file cabinet, vertical 3 drawer/letter				15" x 28" x 42"	8
fva4	file cabinet, vertical 4 drawer/letter				15" x 28" x 52"	8
fva5	file cabinet, vertical 5 drawer/letter				15" x 28" x 60"	8
fvb2	file cabinet, vertical 2 drawer/legal				18" x 28" x 29"	9
fvb3	file cabinet, vertical 3 drawer/legal				18" x 28" x 42"	9
fvb4	file cabinet, vertical 4 drawer/legal				18" x 28" x 52"	9
fvb5	file cabinet, vertical 5 drawer/legal				18" x 28" x 60"	9
fvsp	file cabinet, vertical special				see program	
fwa	file cabinet, wall mounted 1 drawer				24" x 16" x 13"	10
fwb	file cabinet, wall mounted 2 drawer				36" x 16" x 13"	14
fwc	file cabinet, wall mounted 3 drawer				48" x 16" x 13"	19
pc1	photocopier, small w/base				48" x 26"	30
pc2	photocopier, medium w/base				60" x 36"	42
pc3	photocopier, large w/base				136" x 126"	172
isa1	industrial shelving, open				36" x 12" x 72"	9
isa2	industrial shelving, open				36" x 18" x 72"	11
isa3	industrial shelving, open				36" x 24" x 72"	12
isb1	industrial shelving, open				42" x 12" x 72"	11
isb2	industrial shelving, open				42" x 18" x 72"	13
isb3	industrial shelving, open				42" x 24" x 72"	14
isc1	industrial shelving, open				48" x 12" x 72"	12
isc2	industrial shelving, open				48" x 18" x 72"	14
isc3	industrial shelving, open				48" x 24" x 72"	16
sca1	storage cabinet w/shelves, 2 doors				36" x 12" x 72"	12
sca2	storage cabinet w/shelves, 2 doors				36" x 18" x 72"	14
sca3	storage cabinet w/shelves, 2 doors				36" x 24" x 72"	15
scb1	storage cabinet w/shelves, 2 doors				42" x 12" x 72"	15
scb2	storage cabinet w/shelves, 2 doors				42" x 18" x 72"	17
scb3	storage cabinet w/shelves, 2 doors				42" x 24" x 72"	20
scc1	storage cabinet w/shelves, 2 doors				48" x 12" x 72"	18
scc2	storage cabinet w/shelves, 2 doors				48" x 18" x 72"	20
scc3	storage cabinet w/shelves, 2 doors				48" x 24" x 72"	22
ssa1	storage shelving/closed back & ends				36" x 12" x 72"	9
ssa2	storage shelving/closed back & ends				36" x 18" x 72"	11
ssa3	storage shelving/closed back & ends				36" x 24" x 72"	12
ssb1	storage shelving/closed back & ends				42" x 12" x 72"	11
ssb2	storage shelving/closed back & ends				42" x 18" x 72"	13
ssb3	storage shelving/closed back & ends				42" x 24" x 72"	14
ssc1	storage shelving/closed back & ends				48" x 12" x 72"	12
ssc2	storage shelving/closed back & ends				48" x 18" x 72"	14
ssc3	storage shelving/closed back & ends				48" x 24" x 72"	16
wca1	workcounter, access 1 side				36" x 24" x 36"	14
wca2	workcounter, access 1 side				36" x 24" x 42"	14
wca3	workcounter, access 1 side				36" x 30" x 36"	15
wca4	workcounter, access 1 side				36" x 30" x 42"	15
wca5	workcounter, access 1 side				48" x 24" x 36"	24
wca6	workcounter, access 1 side				48" x 24" x 42"	26
wca7	workcounter, access 1 side				48" x 30" x 36"	34
wca8	workcounter, access 1 side				48" x 30" x 42"	34

wcb1	workcounter, access 2 sides				36" x 24" x 36"	21
wcb2	workcounter, access 2 sides				36" x 24" x 42"	21
wcb3	workcounter, access 2 sides				36" x 30" x 36"	23
wcb4	workcounter, access 2 sides				36" x 30" x 42"	23
wcb5	workcounter, access 2 sides				48" x 24" x 36"	32
wcb6	workcounter, access 2 sides				48" x 24" x 42"	32
wcb7	workcounter, access 2 sides				48" x 30" x 36"	34
wcb8	workcounter, access 2 sides				48" x 30" x 42"	34
sta1	drafting table				60" x 30" x 29"	29
sta2	drafting table				72" x 30" x 29"	38
sta3	drafting table				84" x 30" x 29"	44
stb1	layout table				60" x 30" x 29"	29
stb2	layout table				84" x 30" x 29"	44
stb3	layout table				126" x 30" x 29"	68
stc1	light table				48" x 42" x 29"	22
wta1	worktable, access 1 side				60" x 30" x 29"	25
wta2	worktable, access 1 side & 1 end				60" x 30" x 29"	38
wta3	worktable, access 1 side & 2 ends				60" x 30" x 29"	50
wta4	worktable, access all 4 sides				60" x 30" x 29"	75
wta5	worktable, access 2 sides				60" x 30" x 29"	38
wta6	worktable, access 2 sides & 1 end				60" x 30" x 29"	56
wtb1	worktable, access 1 side				72" x 36" x 29"	33
wtb2	worktable, access 1 side & 1 end				72" x 36" x 29"	47
wtb3	worktable, access 1 side & 2 ends				72" x 36" x 29"	61
wtb4	worktable, access all 4 sides				72" x 36" x 29"	88
wtb5	worktable, access 2 sides				72" x 36" x 29"	45
wtb6	worktable, access 2 sides & 1 end				72" x 36" x 29"	68
mia1	flat map file				54" x 36"	36
mib1	movable file				see program	
mic1	vertical plan hold				48" x 36"	18
mid1	coat rack				24" x 48"	12
csa1	tandem seat				42" x 18"	7
csb1	table chair				24" x 24"	8
csc1	chair				33" x 33"	12
csd1	love seat				66" x 33"	25
cse1	couch				92" x 33"	36
keal	refrigerator				33" x 30"	17
keb1	kitchen unit				51" x 24" x 87"	26
kec1	coffee station				90" x 24"	41
ked1	kitchenette				168" x 24"	77
kee1	vending machine				36" x 60"	15
tl1	toilet room (not handicapped accessible)				6'0" x 5'0"	30
tl2	toilet room				7'0" x 7'2"	50
tl3	toilet room w/shower				10'6" x 7'6"	79
tl4	toilet room w/expansion				16'0" x 8'8"	139
	each toilet					+26
	each urinal					+22
	each lavatory					+23

Source: Beckwith Consulting Group



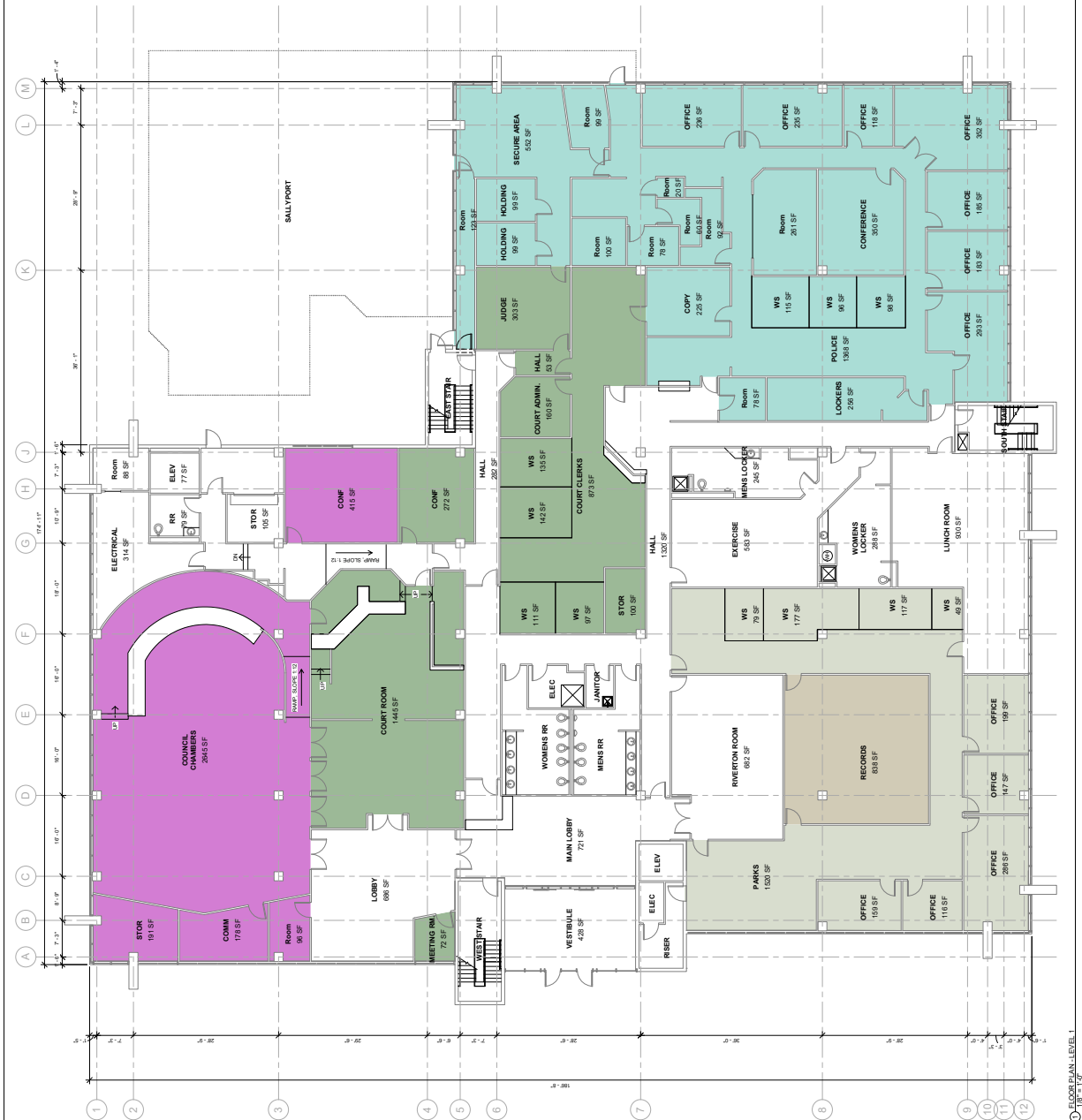
## *APPENDIX D*



**EXISTING PLANS**

PROJECT	NOV 2020
DESIGNER	ARC
DATE	NOV 2020
SCALE	1/8" = 1'-0"
PROJECT NO.	2008-000
SHEET	A2.1

PROGRAM	COMMON	COUNCIL CHAMBERS	COURTS	LEGAL	PARKS	POLICE



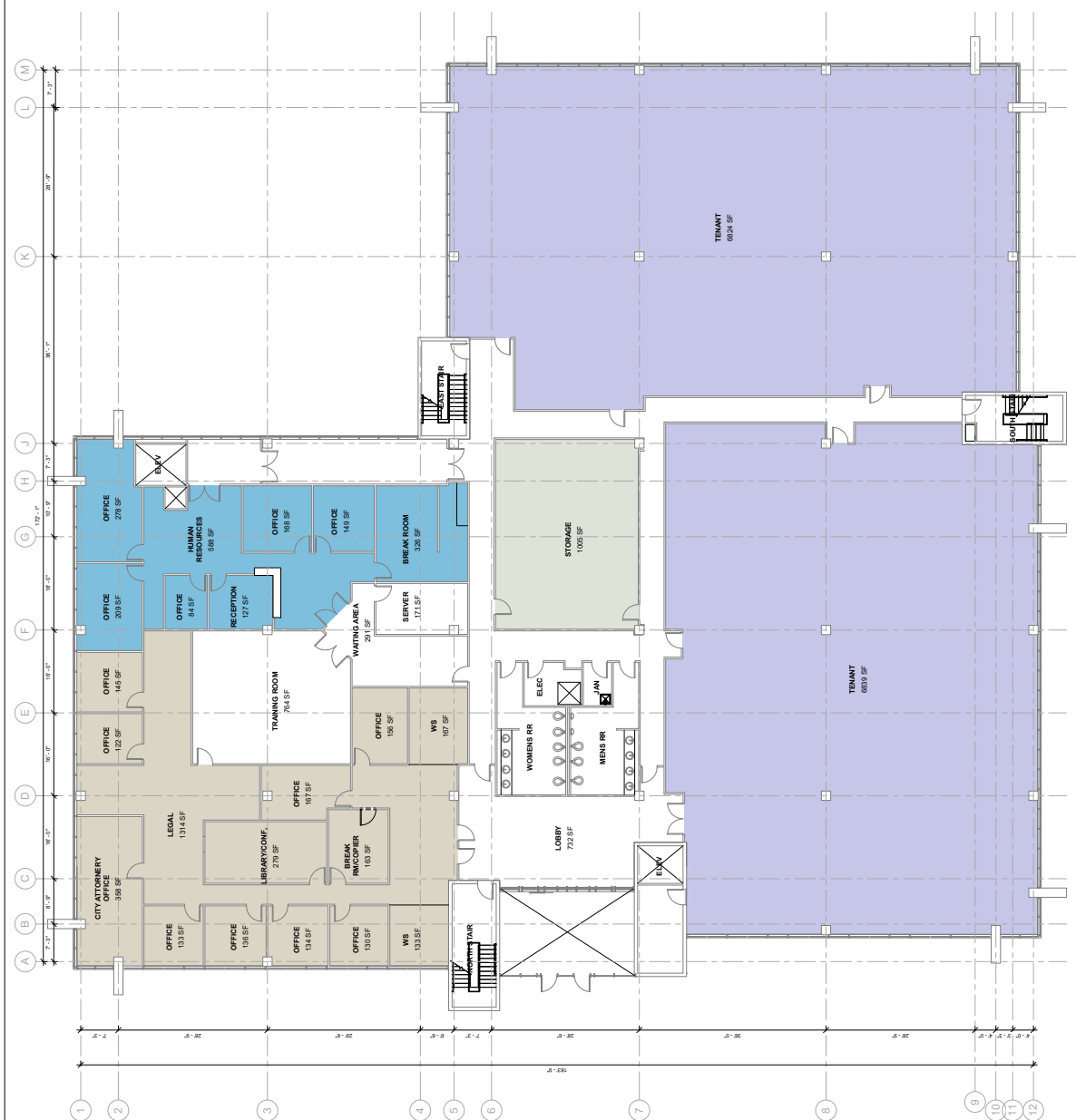
0 FLOOR PLAN LEVEL 1  
1/8" = 1'-0"

[illegible]

CONTENTS:  
EXISTING SECOND  
FLOOR PLAN

DATE:	5/31/97
REVIEW:	Author
REVISED:	Checker
PROJECT NO. 20200018.000	

## A2.2



1 FLOOR PLAN - LEVEL 2  
1/8" = 1'-0"



FLOOR PLAN - LEVEL 3  
1/8" = 1'-0"

- PROGRAM**
- CITY MANAGER
  - COMMON
  - COMMUNITY & ECONOMIC DEVELOPMENT
  - FINANCE
  - PUBLIC WORKS

REVISION	DATE	DESCRIPTION

**EXISTING THIRD FLOOR PLAN**

DATE: 1/26/2020
BY: J. [Name]
CHECKED BY: [Name]
SCALE: AS SHOWN
PROJECT: SEATAC CITY HALL

**A2.3**



**EXISTING PLANS**

DEPARTMENTAL AREA - FIRST FLOOR		
NAME	DEPARTMENT	AREA
LUNCH ROOM	COMMON	930 SF
MAIN LOBBY	COMMON	721 SF
RIVERTON ROOM	COMMON	682 SF
WOMENS RR	COMMON	265 SF
MENS RR	COMMON	262 SF
ELEV	COMMON	64 SF
ELEC	COMMON	40 SF
RISER	COMMON	105 SF
JANITOR	COMMON	46 SF
ELEV	COMMON	88 SF
WOMENS LOCKER	COMMON	288 SF
MENS LOCKER	COMMON	245 SF
RR	COMMON	79 SF
ELEV	COMMON	77 SF
WEST STAIR	COMMON	203 SF
EAST STAIR	COMMON	158 SF
SOUTH STAIR	COMMON	159 SF
LOBBY	COMMON	686 SF
STOR	COMMON	105 SF
VESTIBULE	COMMON	428 SF
HALL	COMMON	282 SF
EXERCISE	COMMON	583 SF
HALL	COMMON	1320 SF
ELECTRICAL	COMMON	314 SF
Room	COMMON	88 SF
SALLYPORT	COMMON	Not Enclosed
COMMON: 26		8214 SF
CONF	COUNCIL CHAMBERS	415 SF
STOR	COUNCIL CHAMBERS	191 SF
COMM	COUNCIL CHAMBERS	178 SF
COUNCIL CHAMBERS	COUNCIL CHAMBERS	2645 SF
Room	COUNCIL CHAMBERS	96 SF
COUNCIL CHAMBERS: 5		3525 SF
COURT CLERKS	COURTS	873 SF
COURT ROOM	COURTS	1445 SF
CONF	COURTS	272 SF
JUDGE	COURTS	303 SF
HALL	COURTS	53 SF
COURT ADMIN.	COURTS	160 SF
STOR	COURTS	100 SF
MEETING RM.	COURTS	72 SF
WS	COURTS	142 SF
WS	COURTS	135 SF
WS	COURTS	111 SF
WS	COURTS	97 SF
COURTS: 12		3762 SF
RECORDS	LEGAL	838 SF
LEGAL: 1		838 SF
PARKS	PARKS	1520 SF
OFFICE	PARKS	159 SF
OFFICE	PARKS	116 SF
OFFICE	PARKS	286 SF
OFFICE	PARKS	147 SF
OFFICE	PARKS	199 SF
WS	PARKS	79 SF
WS	PARKS	177 SF
WS	PARKS	117 SF
WS	PARKS	49 SF
PARKS: 10		2848 SF
POLICE	POLICE	1368 SF
SECURE AREA	POLICE	552 SF
CONFERENCE	POLICE	350 SF
OFFICE	POLICE	293 SF
OFFICE	POLICE	183 SF
OFFICE	POLICE	185 SF
OFFICE	POLICE	352 SF
OFFICE	POLICE	235 SF
OFFICE	POLICE	236 SF
Room	POLICE	99 SF
HOLDING	POLICE	99 SF
HOLDING	POLICE	99 SF
Room	POLICE	123 SF
COPY	POLICE	225 SF
Room	POLICE	78 SF
LOCKERS	POLICE	256 SF
Room	POLICE	92 SF
Room	POLICE	20 SF
Room	POLICE	60 SF
Room	POLICE	78 SF
Room	POLICE	100 SF
OFFICE	POLICE	119 SF
WS	POLICE	98 SF
WS	POLICE	96 SF
WS	POLICE	115 SF
Room	POLICE	261 SF
POLICE: 26		5770 SF
Grand total: 80		24958 SF

DEPARTMENTAL AREA - SECOND FLOOR		
NAME	DEPARTMENT	AREA
ELEV	COMMON	77 SF
NORTH STAIR	COMMON	203 SF
ELEV	COMMON	64 SF
EAST STAIR	COMMON	158 SF
SOUTH STAIR	COMMON	159 SF
TRAINING ROOM	COMMON	764 SF
LOBBY	COMMON	732 SF
WOMENS RR	COMMON	265 SF
MENS RR	COMMON	262 SF
ELEV	COMMON	88 SF
JAN	COMMON	46 SF
SERVER	COMMON	171 SF
WAITING AREA	COMMON	291 SF
COMMON: 13		3278 SF
HUMAN RESOURCES	HUMAN RESOURCES	588 SF
OFFICE	HUMAN RESOURCES	209 SF
OFFICE	HUMAN RESOURCES	278 SF
OFFICE	HUMAN RESOURCES	84 SF
RECEPTION	HUMAN RESOURCES	127 SF
OFFICE	HUMAN RESOURCES	168 SF
OFFICE	HUMAN RESOURCES	149 SF
BREAK ROOM	HUMAN RESOURCES	326 SF
HUMAN RESOURCES: 8		1929 SF
LEGAL	LEGAL	1314 SF
CITY ATTORNEY	LEGAL	358 SF
OFFICE	Not	
OFFICE	LEGAL	122 SF
OFFICE	LEGAL	145 SF
OFFICE	LEGAL	156 SF
OFFICE	LEGAL	167 SF
LIBRARY/CONF.	LEGAL	279 SF
BREAK RM/COPIER	LEGAL	163 SF
OFFICE	LEGAL	130 SF
OFFICE	LEGAL	134 SF
OFFICE	LEGAL	136 SF
OFFICE	LEGAL	133 SF
WS	LEGAL	167 SF
WS	LEGAL	133 SF
LEGAL: 14		3538 SF
STORAGE	PARKS	1005 SF
PARKS: 1		1005 SF
TENANT	TENANT	6839 SF
TENANT	TENANT	6824 SF
TENANT: 2		13663 SF
Grand total: 38		23414 SF

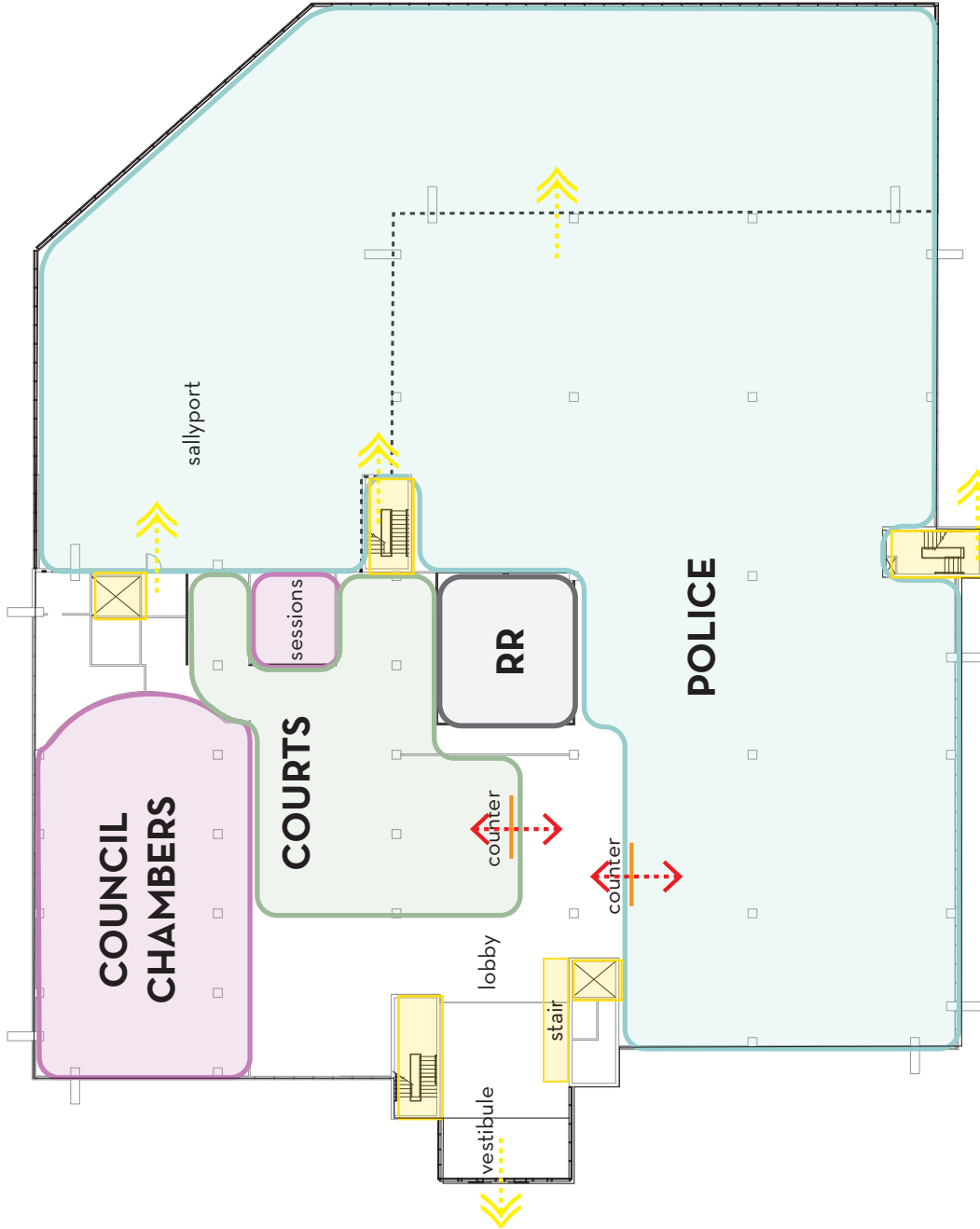
DEPARTMENTAL AREA - THIRD FLOOR		
NAME	DEPARTMENT	AREA
RECEPTION	CITY MANAGER	132 SF
OFFICE	CITY MANAGER	205 SF
OFFICE	CITY MANAGER	185 SF
OFFICE	CITY MANAGER	183 SF
OFFICE	CITY MANAGER	605 SF
OFFICE	CITY MANAGER	163 SF
OFFICE	CITY MANAGER	157 SF
OFFICE	CITY MANAGER	166 SF
CITY MANAGER	CITY MANAGER	1070 SF
WS	CITY MANAGER	137 SF
CITY MANAGER: 10		3002 SF
KITCHEN	COMMON	202 SF
LOBBY	COMMON	1165 SF
WOMENS RR	COMMON	265 SF
SOUTH STAIRS	COMMON	159 SF
STOR	COMMON	149 SF
ELEV	COMMON	64 SF
EAST STAIRS	COMMON	158 SF
NORTH STAIRS	COMMON	203 SF
ELEV	COMMON	77 SF
PERMIT CENTER	COMMON	988 SF
CONFERENCE	COMMON	330 SF
CONFERENCE	COMMON	343 SF
CONFERENCE	COMMON	448 SF
MENS RR	COMMON	262 SF
ELEV	COMMON	88 SF
JAN	COMMON	46 SF
COMMON: 16		4944 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	157 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	153 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	133 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	163 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	124 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	126 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	230 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	164 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	160 SF
OFFICE	COMMUNITY & ECONOMIC DEVELOPMENT	157 SF
COMMUNITY & ECON DEV	COMMUNITY & ECONOMIC DEVELOPMENT	685 SF
PLANNING	COMMUNITY & ECONOMIC DEVELOPMENT	1916 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	86 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	124 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	98 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	158 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	78 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	79 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	123 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	102 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	175 SF
FILES	COMMUNITY & ECONOMIC DEVELOPMENT	321 SF
WS	COMMUNITY & ECONOMIC DEVELOPMENT	106 SF
COMMUNITY & ECONOMIC DEVELOPMENT: 24		5722 SF
COUNCIL OFFICE	COUNCIL CHAMBERS	165 SF
COUNCIL CHAMBERS: 1		165 SF
OFFICE	FINANCE	162 SF
OFFICE	FINANCE	281 SF
OFFICE	FINANCE	148 SF
OFFICE	FINANCE	170 SF
OFFICE	FINANCE	190 SF
OFFICE	FINANCE	178 SF
STORAGE	FINANCE	158 SF
OFFICE	FINANCE	220 SF
SERVER	FINANCE	525 SF
OFFICE	FINANCE	98 SF
OFFICE	FINANCE	112 SF
OFFICE	FINANCE	114 SF
OFFICE	FINANCE	114 SF
FINANCE & SYSTEMS	FINANCE	861 SF
WS	FINANCE	161 SF
WS	FINANCE	139 SF
WS	FINANCE	115 SF
COPIER	FINANCE	221 SF
WS	FINANCE	78 SF
WS	FINANCE	104 SF
WS	FINANCE	108 SF
CIRCULATION	FINANCE	950 SF
WS	FINANCE	129 SF
WS	FINANCE	101 SF
FINANCE: 24		5438 SF
PUBLIC WORKS	PUBLIC WORKS	1755 SF
OFFICE	PUBLIC WORKS	345 SF
OFFICE	PUBLIC WORKS	160 SF
OFFICE	PUBLIC WORKS	216 SF
OFFICE	PUBLIC WORKS	217 SF
OFFICE	PUBLIC WORKS	201 SF
OFFICE	PUBLIC WORKS	207 SF
CONFERENCE	PUBLIC WORKS	152 SF
OFFICE	PUBLIC WORKS	125 SF
OFFICE	PUBLIC WORKS	128 SF
OFFICE	PUBLIC WORKS	211 SF
WS	PUBLIC WORKS	116 SF
WS	PUBLIC WORKS	197 SF
WS	PUBLIC WORKS	118 SF
WS	PUBLIC WORKS	283 SF
WS	PUBLIC WORKS	137 SF
WS	PUBLIC WORKS	153 SF
WS	PUBLIC WORKS	193 SF
WS	PUBLIC WORKS	124 SF
WS	PUBLIC WORKS	82 SF
WS	PUBLIC WORKS	110 SF
WS	PUBLIC WORKS	111 SF
WS	PUBLIC WORKS	108 SF
WS	PUBLIC WORKS	135 SF
OFFICE	PUBLIC WORKS	197 SF
PUBLIC WORKS: 25		5780 SF
Grand total: 100		25050 SF



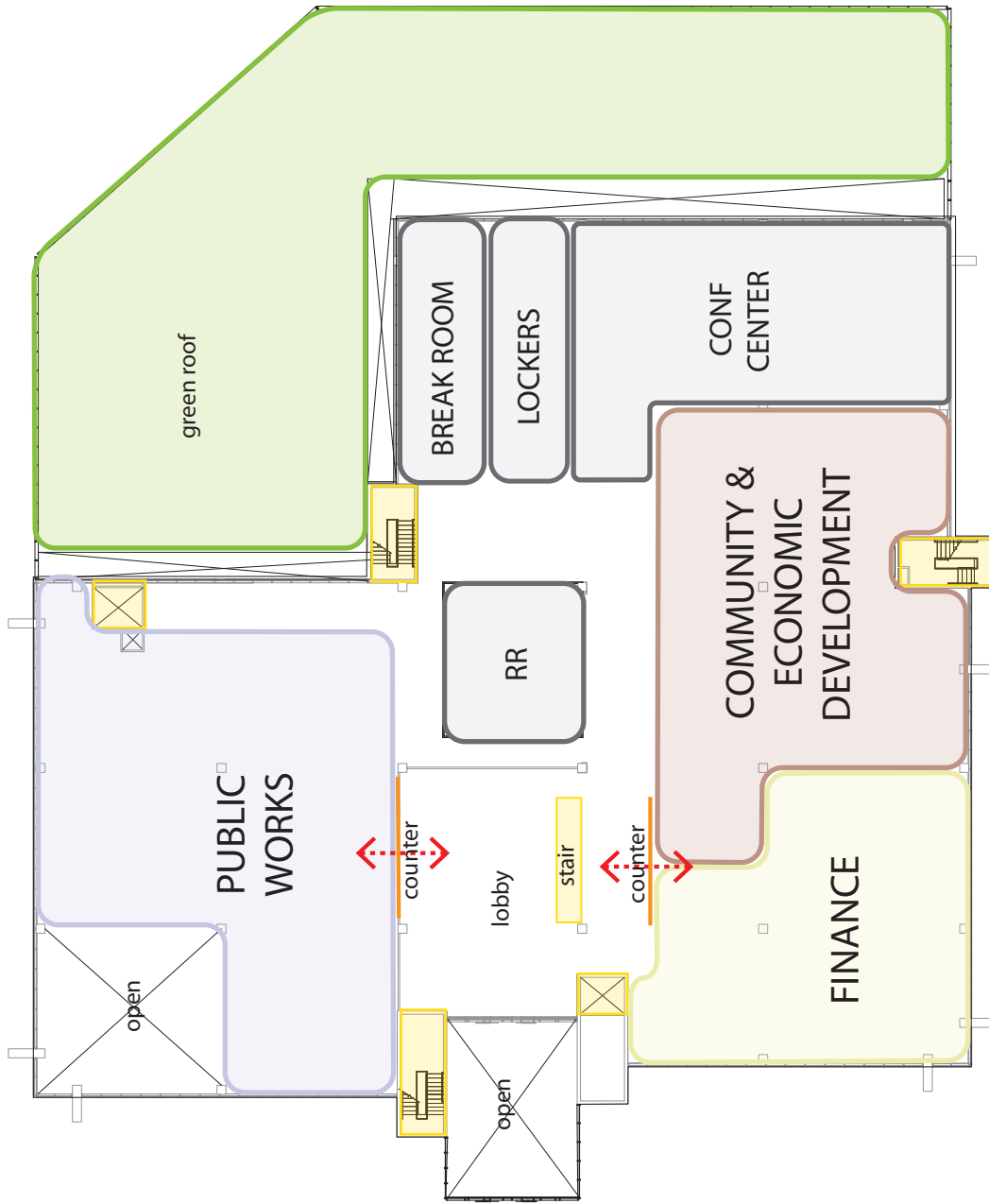
## *APPENDIX E*



DEPARTMENTAL AREA - FIRST FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
ELEV	CIRCULATION	77 SF
WEST STAIR	CIRCULATION	203 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION	CIRCULATION	213 SF
CIRCULATION	CIRCULATION	217 SF
VESTIBULE	CIRCULATION	197 SF
CIRCULATION: 8		1287 SF
ELECTRICAL	COMMON	40 SF
RISER	COMMON	105 SF
RESTROOM	COMMON	79 SF
ELECTRICAL	COMMON	314 SF
STOR	COMMON	88 SF
RESTROOM	COMMON	328 SF
RESTROOM	COMMON	323 SF
JANITOR	COMMON	46 SF
ELECTRICAL	COMMON	88 SF
LOBBY	COMMON	2869 SF
COMMON: 10		4379 SF
SESSIONS	COUNCIL CHAMBERS	317 SF
COUNCIL CHAMBERS	COUNCIL CHAMBERS	3066 SF
COUNCIL CHAMBERS: 2		3382 SF
COURT ADMIN	COURTS	3091 SF
COURTS: 1		3091 SF
POLICE	POLICE	14211 SF
POLICE: 1		14211 SF
POLICE ADDITION	POLICE ADDITION	6335 SF
SALLYPORT & SECURED	POLICE ADDITION	4934 SF
PARKING	POLICE ADDITION: 2	11268 SF
POLICE ADDITION: 2		37618 SF
Grand total: 24		



DEPARTMENTAL AREA - SECOND FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	77 SF
NORTH STAIR	CIRCULATION	203 SF
ELEV	CIRCULATION	64 SF
EAST STAIR	CIRCULATION	158 SF
SOUTH STAIR	CIRCULATION	161 SF
CIRCULATION: 5		663 SF
LOBBY	COMMON	4829 SF
CONFERENCE CENTER	COMMON	2821 SF
RESTROOMS	COMMON	826 SF
BREAK ROOM	COMMON	1077 SF
WELLNESS	COMMON	798 SF
COMMON: 5		10351 SF
CED	COMMUNITY & ECONOMIC DEVELOPMENT	4692 SF
COMMUNITY & ECONOMIC DEVELOPMENT: 1		4692 SF
FINANCE: 1	FINANCE	3260 SF
GREEN ROOF	OUTDOOR	3260 SF
OUTDOOR: 1		10051 SF
PUBLIC WORKS	PUBLIC WORKS	4088 SF
PUBLIC WORKS: 2	PUBLIC WORKS	1888 SF
		5975 SF
Grand total: 15		34993 SF



DEPARTMENTAL AREA - THIRD FLOOR		
NAME	DEPARTMENT	AREA
ELEV	CIRCULATION	64 SF
EAST STAIRS	CIRCULATION	156 SF
NORTH STAIRS	CIRCULATION	203 SF
ELEV	CIRCULATION	77 SF
SOUTH STAIR	CIRCULATION	159 SF
CIRCULATION	CIRCULATION	4057 SF
CIRCULATION: 6	CIRCULATION	4717 SF
CITY MANAGER	CITY MANAGER	2860 SF
CITY MANAGER: 1	CITY MANAGER	2860 SF
STORAGE	COMMON	149 SF
RESTROOMS	COMMON	826 SF
CONFERENCE CENTER	COMMON	2465 SF
SERVER	COMMON	334 SF
RECORDS	COMMON	1179 SF
COMMON: 5	COMMON	4953 SF
FLEX SPACE	FLEX SPACE	2272 SF
FLEX SPACE: 1	FLEX SPACE	2272 SF
HUMAN RESOURCES	HUMAN RESOURCES	3128 SF
HUMAN RESOURCES: 1	HUMAN RESOURCES	3128 SF
LEGAL	LEGAL	3414 SF
LEGAL: 1	LEGAL	3414 SF
COVERED OUTDOOR SPACE	OUTDOOR	2372 SF
OUTDOOR: 1	OUTDOOR	2372 SF
PARKS	PARKS	2184 SF
PARKS: 1	PARKS	2184 SF
Grand total: 17		25699 SF





## *APPENDIX F*

Seismic Evaluation  
of the  
SeaTac City Hall  
4800 South 188<sup>th</sup> Street  
SeaTac, Washington

October 11, 2007



Prepared by

MLA Engineering, pllc  
1411 Fourth Avenue, Suite 760  
Seattle, Washington 98101

MLA Project No. 2007.120

Seismic Evaluation of SeaTac City Hall  
4800 South 188<sup>th</sup> Street  
SeaTac, Washington

Project No. 2007.120  
October 11, 2007

TABLE OF CONTENTS

Executive Summary .....	i
1.0 Introduction .....	1
2.0 Evaluation Scope .....	1
3.0 Existing Building Description .....	2
4.0 Tier 1 and Observed Deficiencies .....	2
5.0 Tier 2 and Observed Deficiencies .....	3
6.0 Evaluation Results .....	4
7.0 Next Steps .....	4
8.0 Scope of Repairs .....	5
9.0 Seismic Upgrade Budgeting .....	6
10.0 Conclusion .....	7

List of Appendices

Appendix A	Figures
Appendix B	Photos
Appendix C	ASCE 31-02 Tier 1 Checklists
Appendix D	Repair Sketches
Appendix E	Calculations

## Seismic Evaluation of the SeaTac City Hall

### Executive Summary

MLA Engineering, pllc was retained to perform a seismic evaluation of the SeaTac City Hall located at 4800 South 188th Street, SeaTac, Washington. The evaluation determines existing seismic vulnerabilities and the feasibility of improving the building to remain operational following a maximum considered earthquake.

The City Hall was designed as an office building in the late 1970s. It is a three-story building with a total building area of approximately 91,300 sf. The structure is constructed from cast-in-place concrete.

MLA performed two seismic evaluations, first using Life Safety as the performance objective followed by a second evaluation using Immediate Occupancy as the performance objective. Life Safety is roughly equivalent to the seismic performance for a new building. Immediate Occupancy is roughly equivalent to the seismic performance for a new hospital, fire station or police station. The results of these evaluations may be used by the owner to evaluate risk and potential mitigation thereby reducing exposure to risk and improving the likelihood that the building can remain operational after a significant earthquake.

MLA has determined that City Hall does not meet the Life Safety or Immediate Occupancy performance objectives.

It is MLA's opinion that the City Hall can be seismically upgraded to meet either performance objective. The costs for this project may range from \$40/sf to \$75/sf. For this estimated range, the seismic rehabilitation project would cost between \$3.7 and \$6.9 million. A more precise estimate can be provided after the next stage of design occurs. The effects on finishes, ductwork, routing, and electrical systems would then be investigated and a cost determined.

The City is cautioned to treat these costs as a rough order of magnitude only. The values would reflect our opinion of probable construction costs for the structural work. If the project moves forward, an estimator should establish budgeting cost after a schematic design effort by a team of consultants to identify the complete scope of work.

Seismic Evaluation of SeaTac City Hall  
4800 South 188<sup>th</sup> Street  
SeaTac, Washington

## 1.0 Introduction

MLA Engineering, pllc was retained to perform a seismic evaluation of the SeaTac City Hall located at 4800 South 188th Street, SeaTac, Washington.

## 2.0 Evaluation Scope

MLA was asked to evaluate the building using Immediate Occupancy as the performance objective. An earlier study had determined that the building had several seismic deficiencies when evaluated for Immediate Occupancy. MLA verified the earlier Tier 1 study and then completed the Tier 2 study. Our scope of work did not include evaluating the nonstructural items such as, ceilings, light fixtures, mechanical equipment, etc.

A typical seismic evaluation project would study the building using the ASCE 31-02 "*Seismic Evaluation of Existing Buildings*" standard. It provides a tiered process for the seismic evaluation of existing buildings to either the Life Safety or Immediate Occupancy performance levels. A performance objective is defined as the post-earthquake damage state of a building.

**Life Safety** is defined as "Building performance that includes damage to both structural and nonstructural components during a design earthquake such that partial or total structural collapse does not occur, and damage to nonstructural components is non-life threatening". *This is equivalent to the performance of a new building.*

**Immediate Occupancy** is defined as "Building performance that includes damage to both structural and nonstructural components during a design earthquake such that the damage is not life-threatening, so as to permit immediate occupancy of the building after a design earthquake and that damage is repairable while the building is occupied". *This is equivalent to the performance of a new hospital.*

The ASCE 31 guidelines we used provide a tiered approach for evaluating seismic performance of existing buildings. Tier 1 provides a checklist of structural characteristics and an approximate analysis of primary lateral load-carrying elements. This list and analysis are used to determine if the building meets the required performance objective of Immediate Occupancy. Tier 2 provides a more detailed and precise analysis for elements that did not pass the Tier 1 test. It determines if the elements identified in Tier 1 are still deficiencies when viewed more closely. Tier 3 methods, which can be used for developing final construction documents, include the implementation of strengthening building elements that did not pass the Tier 2 evaluation for the desired level of seismic resisting performance.

For this study, MLA has evaluated the building using the Tier 1 and Tier 2 criteria with an "Immediate Occupancy" performance level, identified the deficiencies and provided



recommended repair strategies to remediate any deficiencies. The results of this seismic evaluation may be used by the owner to evaluate risk and potential mitigation that can reduce the exposure to risk.

### **3.0 Existing Building Description**

The City Hall was designed as an office building in the late 1970s. The building is a three-story building with a square shaped footprint, 188 ft x 188 ft. The northeast corner is notched out 70 ft x 70 ft. The building footprint is 30,400 square feet. The total building area is approximately 91,300 sf. There is a loading dock, mechanical equipment and trash enclosure located in the notch. There is a small penthouse on the roof.

The building structure is constructed from cast-in-place concrete. The roof and floors are one-way concrete joists that span between concrete beams. The beams are supported by concrete columns and walls. The columns and walls are supported by individual spread footings. The building resists wind and seismic lateral loads using concrete shear walls.

The first floor exterior walls are half-height concrete masonry walls with continuous ribbon windows above. The balance of the exterior walls is constructed with light gauge framing that creates the exterior wall and protruding awning/soffit. Continuous ribbon windows placed between the light gauge walls.

### **4.0 Tier 1 and Observed Deficiencies**

Our study revealed the following list of ASCE 31-02 Tier 1 deficiencies using an Immediate Occupancy performance level:

1. The building height to lateral element length ratio does not satisfy the overturning limit. (ASCE 31-02, 4.7.3.2) Basic Foundations Checklist.
2. Some concrete wall elements possess cracks in excess of 1/16", the upper limit. (ASCE 31-02, 4.3.3.9) Basic Checklist C2.
3. The shear stress calculated by the Quick Procedure exceeds the allowable shear stress. (ASCE 31-02, 4.4.2.2.1) Basic Checklist C2.
4. The secondary components do not have the shear capacity to develop the strength of the components and meet other requirements. (ASCE 31-02, 4.4.1.6.2) Supplemental Checklist C2.
5. The diaphragm (floor and roof) openings adjacent to the shear walls exceed the permitted opening size. (ASCE 31-02, 4.5.1.4) Supplemental Checklist C2.
6. The diaphragms do not have the tensile capacity to develop the diaphragm strength at re-entrant corners. (ASCE 31-02, 4.5.1.7) Supplemental Checklist C2.

MLA also noted some additional deficiencies.

7. MLA re-evaluated the deficiencies noted above using a Life Safety performance objective. We were curious to see if the building's identified shortcomings extended to the lower, Life Safety, performance level. Our findings showed that the first three deficiencies exist with the Life Safety performance level.
8. MLA also observed that the exterior wall was constructed with stack bond masonry below a ribbon window. It is unlikely that this element can resist the ASCE 31 seismic loadings. The exterior wall evaluations are part of the nonstructural evaluation and are not included in our scope of work.

The six identified Tier 1 deficiencies were used to establish the scope of work for the Tier 2 evaluation.

## **5.0 Tier 2 and Observed Deficiencies**

MLA performed the Tier 2 analysis using the procedures set forth in ASCE 31-02. We used the Linear Static Procedure to determine the lateral forces. Our analysis showed that the building is considered torsionally irregular. Therefore, we considered the multidirectional excitation effects in our analysis.

The Tier 2 check consists of additional structural analyses that are performed on all of the items that failed the Tier 1 check. These calculations are more exact than the broad-brush analysis using Tier 1 methods. The results are as follows:

1. Some concrete wall elements possess cracks in excess of 1/16", the upper limit. (ASCE 31-02, 4.3.3.9) These cracks occur on the walls noted on the floor plan.
2. The concrete shear walls are overstressed. (ASCE 31-02, 4.4.2.1.1) The Demand-Capacity ratios (DCR) for the eight shear walls range from 1.78 to 3.96. The DCR should be less than 1.00.
3. Diaphragm openings immediately adjacent to the shear walls shall be less than 25% of the wall length for Life Safety and 15% of the wall length for Immediate Occupancy. (ASCE 31-02, 4.5.1.4). The diaphragm is either the roof or floor slab.
4. The ratio of the horizontal dimension of the lateral-force-resisting system at the foundation level to the building height (base/height) shall be greater than 0.6Sa. (ASCE 31-02, 4.7.3.2).

MLA also noted some additional deficiencies.

5. The diaphragms are overloaded when delivering the lateral forces to the shear walls. A drag strut or collector is required to transfer the diaphragm forces to the shear walls.

The building has deficiencies 1, 2 and 4 noted above when evaluated using a Life Safety performance objective.

## 6.0 Evaluation Results

The structural calculations show that the SeaTac City Hall **DOES NOT** meet either the Life Safety or the Immediate Occupancy performance objectives of ASCE 31-02.

The City Hall building is seismically deficient. The building is also “grandfathered in” as an existing structure. The building code does not require an owner to seismically upgrade an existing building that is found to be deficient. However, the code does address structural deficiencies by integrating them with other work. For instance, if the building were to undergo extensive renovation or change its occupancy class, the building code would make the seismic upgrade mandatory. In the City’s case, any seismic upgrade work on City Hall would be voluntary.

## 7.0 Next Steps

MLA recommends that the City proceed with a seismic upgrade to bring the City Hall up to a Life Safety performance level at a minimum. This performance objective is roughly equivalent to the performance of a new building. New buildings are designed to prevent the loss of life during an earthquake but not to protect the structure. After a major seismic event the structure may not be usable or may be damaged beyond economic repair.

The City may also want to consider taking the next step and upgrading the building to an Immediate Occupancy performance level. Since the structure has the same problems under each performance objective, the scope of repairs will be very similar with each. The incremental cost to move up to the next level will not be significantly higher. This recommendation does not consider the costs of upgrading the non-structural systems.

MLA recommends completing some additional testing prior to beginning the design of seismic retrofits. Several elements in our evaluation were indeterminate. Specifically we recommend:

1. Take X-rays to determine the doweling method between the walls and the foundations. This information is not legible on the original construction documents.
2. Take X-rays at the ends of the existing shear walls to determine the how the horizontal reinforcing was terminated. This information will determine the strength of the existing boundary elements.
3. Take concrete cores to determine the as-built concrete strength of the columns, shear walls and floors.
4. Engage a geotechnical engineer to provide the design parameters for the shear wall or braced frame foundations. The final design will require the allowable bearing capacity of the soil and recommendations and design parameters for foundation systems resisting uplift loads.

## 8.0 Scope of Repairs

MLA has performed a schematic design that approximates the extent of work required to seismically upgrade the City Hall to both a Life Safety and Immediate Occupancy performance level. Much of the work is similar for each performance level. The difference will be the amount or extent of supplemental reinforcing. Typically the Immediate Occupancy level will require more upgrade work than the Life Safety level.

The anticipated work to seismically retrofit the SeaTac City Hall to a Life Safety performance level is as follows:

- Construct a new boundary termination element at the end of existing shear wall located between columns F-6 and F-8. See Figure D-1 or D-7 for the plan location. The end of the wall is separated from column F-8 by a large door opening. This opening effectively moves the effective end of the wall from the column to the door jamb. It is likely that the door jamb is inadequately reinforced. Construct a foundation underneath the boundary element. See Figure D-6.
- Add four concrete shear walls where noted in Figures D-1, D-2 and D-3 or eight steel braced frames where noted in Figures D-7, D-8 and D-9. These elements will lower the shear stress in the existing concrete shear walls to acceptable levels. Each new concrete shear wall will require a new foundation capable of resisting uplift forces, and the construction of a collector to transfer forces from the diaphragm into the new shear walls. See Figure D-4.

Each new steel braced frame will require a new foundation capable of resisting uplift forces, the construction of an upper and lower mounting point to connect the steel frame to the concrete frame, and the construction of a collector to transfer forces from the diaphragm into the braced frame. See Figure D-10.

- Add diaphragm collector elements where noted in Figures D-7, D-8 and D-9. Diaphragm collector elements would be installed in the depth of the floor framing system. The collector would be constructed between the existing concrete joists that make up the floor system using shotcrete and rebar. See Figure D-5.
- Repair the concrete wall cracks in the shear walls shall be epoxy injected for the full depth of the crack to bring the wall's strength back to its expected strength.
- Reinforce the diaphragms near the large openings to transfer loads to a suitable member. See Figure D-6.

The anticipated work to seismically retrofit the SeaTac City Hall to an Immediate Occupancy performance level is similar to the Life Safety work. However, the upgrades will be more robust. The anticipated work is as follows:

- Construct a new boundary termination element at the end of existing shear wall located between columns F-6 and F-8. See Figure D-1 for the plan location. The end of the wall is separated from column F-8 by a large door opening. This opening

effectively moves the effective end of the wall from the column to the door jamb. It is likely that the door jamb is inadequately reinforced. Construct a foundation underneath the boundary element. See Figure D-6.

- Add four concrete shear walls where noted in Figures D-1, D-2 and D-3. These elements will lower the shear stress in the existing concrete shear walls to acceptable levels. Each new concrete shear wall will require a new foundation capable of resisting uplift forces, and the construction of a collector to transfer forces from the diaphragm into the new shear walls. See Figure D-4.
- Add diaphragm collector elements where noted in Figures D-1, D-2 and D-3. Diaphragm collector elements would be installed in the depth of the floor framing system. The collector would be constructed between the existing concrete joists that make up the floor system using shotcrete and rebar. See Figure D-5.
- Repair the concrete wall cracks in the shear walls shall be epoxy injected for the full depth of the crack to bring the wall's strength back to its expected strength.
- Reinforce the diaphragms near the large openings to transfer loads to a suitable member. See Figure D-5.

MLA also recommends that the City upgrade the non-structural elements to the performance level of either Life Safety or Immediate Occupancy, to match the performance level selected for the seismic upgrade. These elements include ceiling grids, light fixtures, piping supports, duct supports, filing cabinets, etc.

## **9.0 Seismic Upgrade Budgeting**

Seismic rehab projects of this nature traditionally are schematically estimated on a \$/square foot basis. The costs for this project may range from \$40/sf to \$75/sf. For this estimated range, the seismic rehabilitation project would cost between \$3.7 and \$6.9 million.

The City is cautioned to treat these costs as a rough order of magnitude cost only. The values reflect our opinion of probable construction cost for the structural work. If the project moves forward, an estimator should establish budgeting costs after a schematic design effort by a team of consultants to identify a complete scope of work.

The structural work will mandate that the existing interior finishes be removed for construction access. MLA recommends that the City retain an architect to identify electrical and mechanical systems to be relocated, interior finishes to be removed and replaced, and coordinate the construction process.

## 10.0 Conclusion

MLA has determined that the SeaTac City Hall does not comply with the ASCE 31-02 for compliance with either a Life Safety or Immediate Occupancy performance level.

We would like an opportunity to meet with you and discuss these findings with a goal of assisting you in planning future steps. MLA appreciates the opportunity to be of service to you.

Sincerely,

**MLA Engineering, pllc**



Andrew Stouppe, P.E., S.E.  
Project Engineer

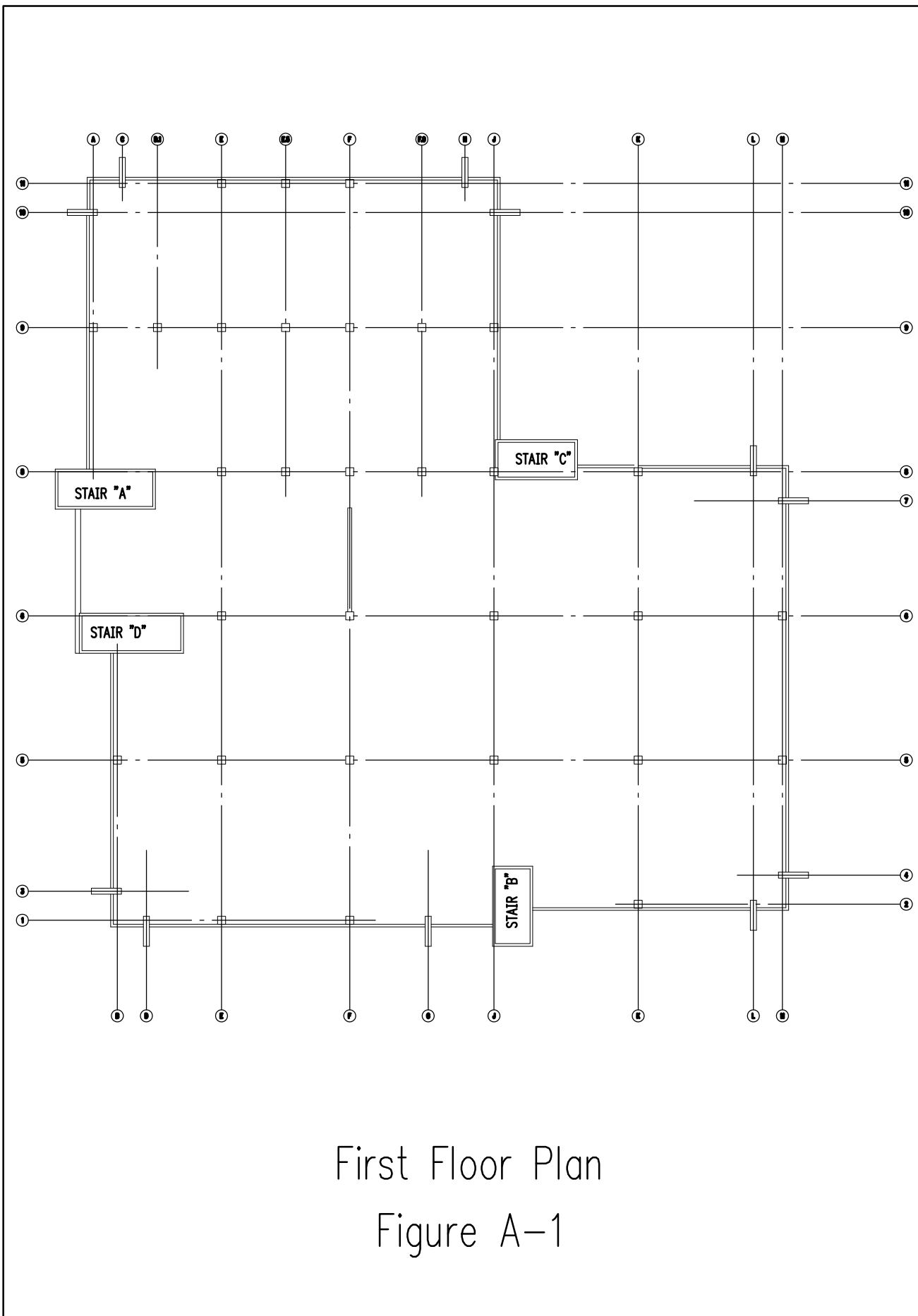


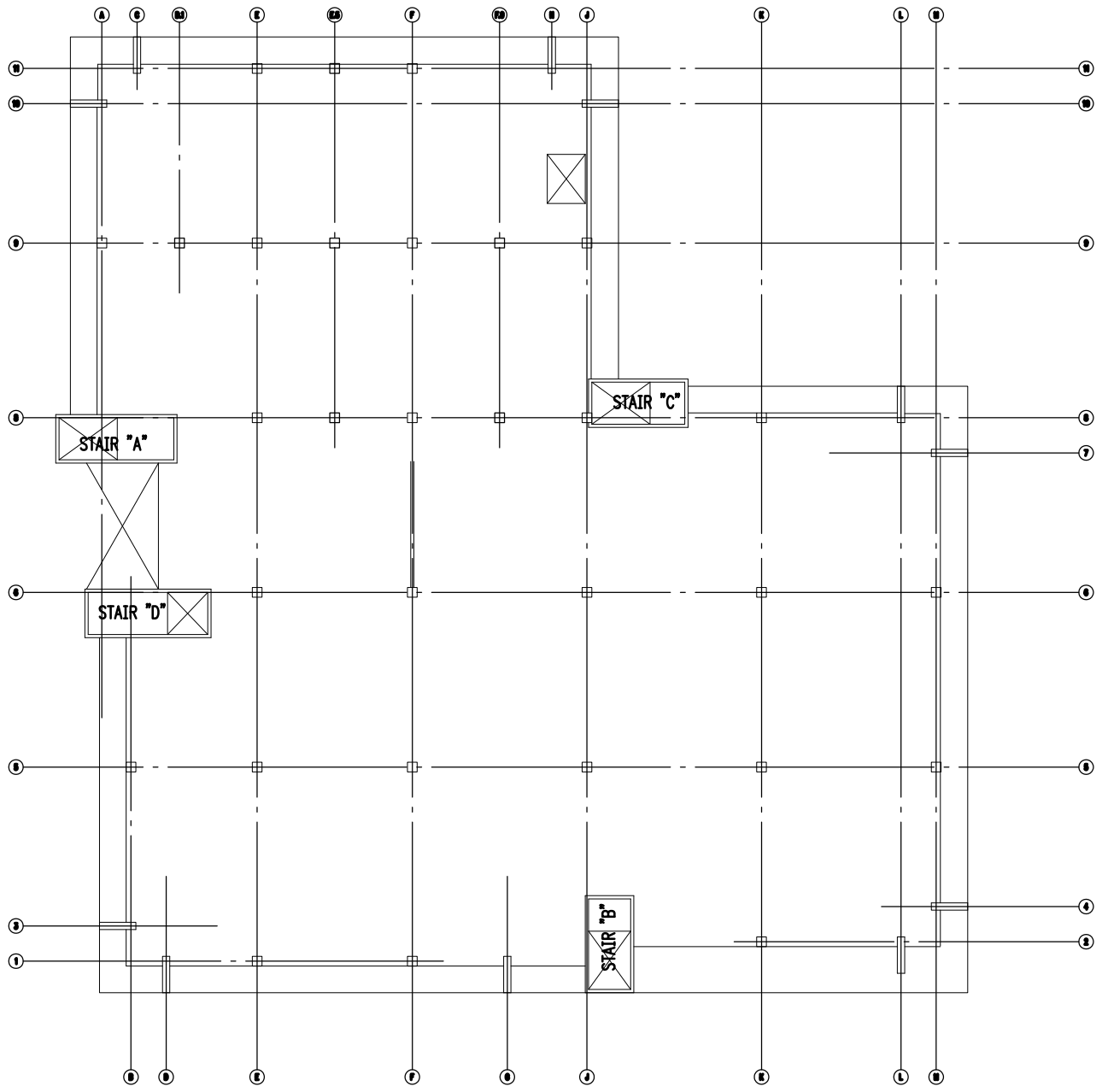
Michael S. Leonard, P.E., S.E.  
Principal



SeaTac City Hall  
Seismic Evaluation  
SeaTac, Washington

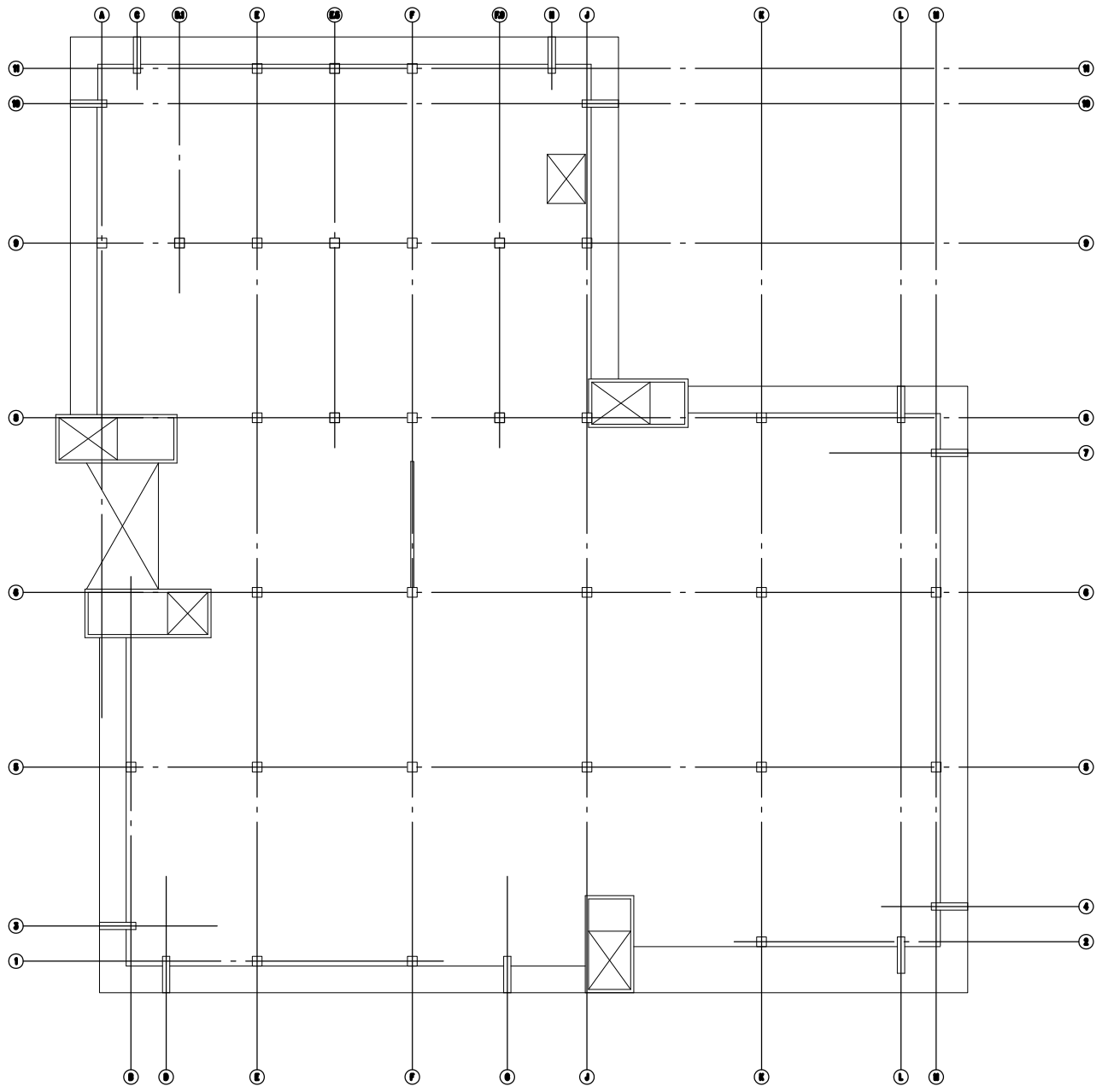
## Appendix A Figures





Second Floor Plan

Figure A-2



Third Floor Plan  
Figure A-3

SeaTac City Hall  
Seismic Evaluation  
SeaTac, Washington

## Appendix B Site Photos



**Photo 1.** Main Entry of City Hall.



**Photo 2.** Southwest Corner of Building looking west.





**Photo 3.** Southwest Corner of Building looking east.



**Photo 4.** Southeast Corner of Building looking east.



**Photo 5.** Northeast Corner of Building looking west.



**Photo 6.** Northeast Face of Building looking at courtyard.



**Photo 7.** Northwest Face of Building looking west.



**Photo 8.** Concrete wall crack at Stair B.



**Photo 9.** Concrete wall crack at Stair B.

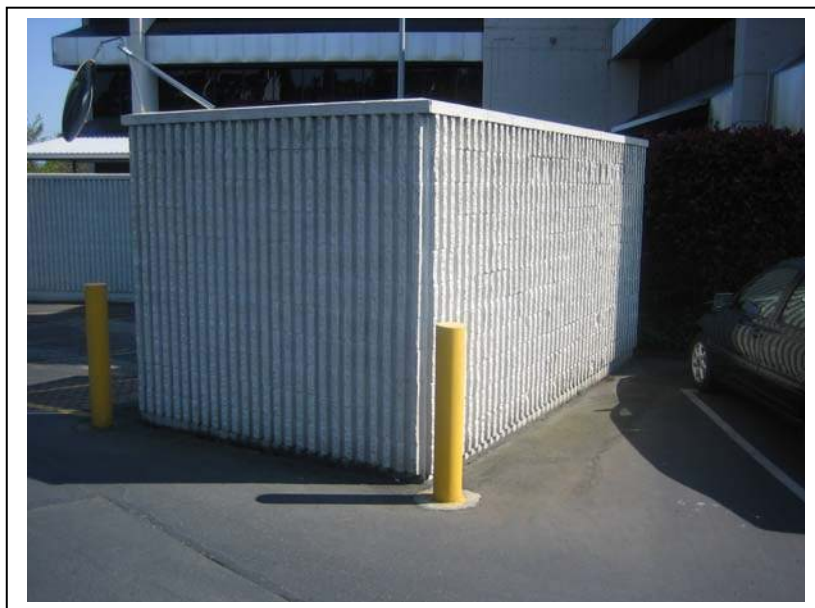


**Photo 10.** Concrete wall crack at Exterior of Elevator.





**Photo 11.** Masonry Infill Wall Detail.



**Photo 12.** Trash Enclosure at Courtyard.



**Photo 13.** South face of Stair A at ground level.



**Photo 14.** SE corner of Stair B at 2<sup>nd</sup> floor landing.



SeaTac City Hall  
Seismic Evaluation  
SeaTac, Washington

## Appendix C Tier 1 Checklists

Building Name: SeaTac City Hall

Date: May 15, 2007

Building Address: 4800 South 188th Street, SeaTac, WA

Page: 1 of 1

Job Number: 6402

Job Name: SeaTac City Hall Evaluation

By: DP Checked: AJS

## ASCE 31 GEOLOGIC SITE HAZARDS AND FOUNDATIONS CHECKLIST

C NC N/A

Comments

### GEOLOGIC SITE HAZARDS

The following statements only need be completed for buildings in levels of high or moderate seismicity.

- |                                     |                          |                          |         |   |
|-------------------------------------|--------------------------|--------------------------|---------|---|
| <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | 4.7.1.1 | LIQUEFACTION: Liquefaction-susceptible, saturated, loose granular soils that could jeopardize the building's seismic performance shall not exist in the foundation soils at depths within 50 feet under the building for Life Safety and Immediate Occupancy. |
| unknown                             |                          |                          |         |   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4.7.1.2 | SLOPE FAILURE: The building site shall be sufficiently remote from potential earthquake-induced slope failures or rockfalls to be unaffected by such failures or shall be capable of accommodating any predicted movements without failure.                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4.7.1.3 | SURFACE FAULT RUPTURE: Surface fault rupture and surface displacement at the building site is not anticipated.  |

### CONDITIONS OF FOUNDATIONS

- |                                     |                          |                          |         |   |
|-------------------------------------|--------------------------|--------------------------|---------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4.7.2.1 | FOUNDATION PERFORMANCE: There shall be no evidence of excessive foundation movement such as settlement or heave that would affect the integrity or strength of the structure. |
|-------------------------------------|--------------------------|--------------------------|---------|---|

The following statement only need be completed for buildings in levels of high or moderate seismicity being evaluated to the Immediate Occupancy Performance Level.

- |                                     |                          |                          |         |  |
|-------------------------------------|--------------------------|--------------------------|---------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4.7.2.2 | DETERIORATION: There shall not be evidence that foundation elements have deteriorated due to corrosion, sulfate attack, material breakdown, or other reasons in a manner that would affect the integrity or strength of the structure. |
|-------------------------------------|--------------------------|--------------------------|---------|--|

### CAPACITY OF FOUNDATIONS

- |                          |                          |                                     |         |  |
|--------------------------|--------------------------|-------------------------------------|---------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 4.7.3.1 | POLE FOUNDATIONS: Pole foundations shall have a minimum embedment depth of 4 ft for Life Safety and Immediate Occupancy. |
|--------------------------|--------------------------|-------------------------------------|---------|--|

The following statements only need be completed for buildings in levels of moderate seismicity being evaluated to the Immediate Occupancy Performance Level and for buildings in levels of high seismicity.

- |                                     |                                     |                                     |         |   |
|-------------------------------------|-------------------------------------|-------------------------------------|---------|---|
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 4.7.3.2 | OVERTURNING: The ratio of the horizontal dimension of the lateral force-resisting system at the foundation level to the building height (base/height) shall be greater than $0.6S_a$ . <b><math>L/H = 0.51 &gt; 0.528 (0.6S_a)</math></b> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 4.7.3.3 | TIES BETWEEN FOUNDATION ELEMENTS: The foundation shall have ties adequate to resist seismic forces where footings, piles, and piers are not restrained by beams, slabs, or soils classified as Class A, B, or C. (Section 3.5.2.3.1)      |
| <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 4.7.3.4 | DEEP FOUNDATIONS: Piles and piers shall be capable of transferring the lateral forces between the structure and the soil. This statement shall apply to the Immediate Occupancy Performance Level only.                                   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 4.7.3.5 | SLOPING SITES: The difference in foundation embedment depth from one side of the building to another shall not exceed one story in height. This statement shall apply to the Immediate Occupancy Performance Level only.                  |

Building Name: SeaTac City Hall

Date: May 15, 2007

Building Address: 4800 South 188th Street, SeaTac, WA

Page: 1 of 2

Job Number: 6402 Job Name: SeaTac City Hall Evaluation

By: DP Checked: AJS

## ASCE 31 BASIC CHECKLIST C2: CONCRETE SHEAR WALL BUILDINGS WITH RIGID OR STIFF DIAPHRAGMS

C	NC	N/A		Comments
<b>BUILDING SYSTEM</b>				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3.1.1	LOAD PATH: The structure shall contain a minimum of one complete load path for Life Safety and Immediate Occupancy for seismic force effects from any horizontal direction that serves to transfer the inertial forces from the mass to the foundation.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.3.1.3	MEZZANINES: Interior mezzanine levels shall be braced independently from the main structure, or shall be anchored to the lateral-force-resisting elements of the main structure. <b>There are no mezzanines.</b>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3.2.1	WEAK STORY: The strength of the lateral-force-resisting system in any story shall not be less than 80% of the strength in an adjacent story above or below for Life-Safety and Immediate Occupancy.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3.2.2	SOFT STORY: The stiffness of the lateral-force-resisting-system in any story shall not be less than 70% of the lateral-force-resisting system stiffness in an adjacent story above or below, or less than 80% of the average lateral-force-resisting system stiffness of the three stories above or below for Life Safety and Immediate Occupancy.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3.2.3	GEOMETRY: There shall be no changes in horizontal dimension of the lateral-force-resisting system of more than 30% in a story relative to adjacent stories for Life Safety and Immediate Occupancy, excluding one-story penthouses and mezzanines.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3.2.4	VERTICAL DISCONTINUITIES: All vertical elements in the lateral-force-resisting system shall be continuous to the foundation.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3.2.5	MASS: There shall be no change in effective mass of more than 50% from one story to the next for Life Safety and Immediate Occupancy. Light roofs, penthouses and mezzanines need not be considered.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3.2.6	TORSION: The estimated distance between the story center of mass and the story center of rigidity shall be less than 20% of the building width in either plan dimension for Life Safety and Immediate Occupancy.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.3.3.4	DETERIORATION OF CONCRETE: There shall be no visible deterioration of concrete or reinforcing steel in any of the vertical- or lateral-force-resisting elements.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.3.3.5	POST-TENSIONING ANCHORS: There shall be no evidence of corrosion or spalling in the vicinity of post-tensioning or end fittings. Coil anchors shall not have been used. <b>Post-tensioning was not used in the building.</b>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.3.3.9	CONCRETE WALL CRACKS: All existing diagonal cracks in wall elements shall be less than 1/8" for Life Safety and 1/16" for Immediate Occupancy, shall not be concentrated in one location, and shall not form an X pattern. <b>The observed cracks were greater than 1/16" but did not form an X pattern.</b>

Building Name: SeaTac City Hall

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Page: 2 of 2

Job Number: 6402 Job Name: SeaTac City Hall Evaluation

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## ASCE 31 BASIC CHECKLIST C2: CONCRETE SHEAR WALL BUILDINGS WITH RIGID OR STIFF DIAPHRAGMS

C	NC	N/A		Comments
<b>LATERAL-FORCE-RESISTING SYSTEM</b>				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4.1.6.1	COMPLETE FRAMES: Steel or concrete frames classified as secondary components shall form a complete vertical load carrying system.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4.2.1.1	REDUNDANCY: The number of lines of shear walls in each principal direction shall be greater than or equal to 2 for Life Safety and Immediate Occupancy.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.4.2.2.1	SHEAR STRESS CHECK: The shear stress in the concrete shear walls, calculated using the Quick Check procedure of Section 3.5.3.3, shall be less than 100 psi or $2\sqrt{f'_c}$ for Life Safety and Immediate Occupancy.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4.2.2.2	REINFORCING STEEL: The ratio of reinforcing steel area to gross concrete area shall be not less than 0.0015 in the vertical direction and 0.0025 in the horizontal direction for Life Safety and Immediate Occupancy. The spacing of reinforcing steel shall be equal to or less than 18" for Life Safety and Immediate Occupancy.
<b>CONNECTIONS</b>				
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.6.2.1	TRANSFER TO SHEAR WALLS: Diaphragms shall be connected for transfer of loads to the shear walls for Life Safety and the connections shall be able to develop the lesser of the shear strength of the walls or diaphragms for Immediate Occupancy.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.6.3.5	FOUNDATION DOWELS: Wall reinforcement shall be doweled into the foundation for Life Safety and the dowels shall be able to develop the lesser of the strength of the walls or the uplift capacity of the foundation for Immediate Occupancy.
		unknown		

The shear stresses are 453 psi and 542 psi in the two orthogonal directions that exceed the 63 psi allowable stress.

Where the diaphragm is connected to the shear wall for the full length of the shear wall, it complies. In the other cases, the diaphragms do not comply.

The available construction documents were not legible. Field testing will be required.

Building Name: SeaTac City Hall

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Building Address: 4800 South 188th Street, SeaTac, WA

Page: 1 of 2

Job Number: 6402 Job Name: SeaTac City Hall Evaluation

By: DP Checked: AJS

## ASCE 31 SUPPLEMENTAL CHECKLIST C2: CONCRETE SHEAR WALL BUILDINGS WITH RIGID OR STIFF DIAPHRAGMS

C	NC	N/A			Comments
LATERAL-FORCE-RESISTING SYSTEM					
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.4.1.6.2	DEFLECTION COMPATIBILITY: Secondary components shall have the shear capacity to develop the flexural strength of the components for Life Safety and shall meet the requirements of 4.4.1.4.9, 4.4.1.4.10, 4.4.1.4.11, 4.4.1.4.12 and 4.4.1.4.15 for Immediate Occupancy.	The column bar splice length does not meet the requirements of 4.4.1.9. (4'-2" required, 2'-6" provided)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4.1.6.3	FLAT SLABS: Flat slabs/plates not part of lateral-force-resisting system shall have continuous bottom steel through the column joints for Life Safety.	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.4.2.2.3	COUPLING BEAMS: The stirrups in coupling beams over means of egress shall be spaced at or less than d/2 and shall be anchored into the confined core of the beam with hooks of 135° or more for Life Safety. All coupling beams shall comply with the requirements above and shall have the capacity in shear to develop the uplift capacity of the adjacent wall for Immediate Occupancy.	There are no coupling beams in the shear walls.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4.2.2.4	OVERTURNING: All shear walls shall have aspect ratios less than 4 to 1. Wall piers need not be considered. This statement shall apply to the Immediate Occupancy Performance Level only.	The maximum aspect ratio is 1.00.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4.4.2.2.5	CONFINEMENT REINFORCING: For shear walls with aspect ratios greater than 2 to 1, the boundary elements shall be confined with spirals or ties with spacing less than 8d <sub>b</sub> . This statement shall apply to the Immediate Occupancy Performance Level only.	The aspect ratios for the shear walls do not exceed 2 to 1.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4.2.2.6	REINFORCING AT OPENINGS: There shall be added trim reinforcement around all wall openings greater than three times the thickness of the wall. This statement shall apply to the Immediate Occupancy Performance Level only.	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.4.2.2.7	WALL THICKNESS: Thickness of bearing walls shall not be less than 1/25 the unsupported height or length, whichever is shorter, nor less than 4". This statement shall apply to the Immediate Occupancy Performance Level only.	
DIAPHRAGMS					
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4.5.1.1	DIAPHRAGM CONTINUITY: The diaphragms shall not be composed of split-level floors and shall not have expansion joints.	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.5.1.4	OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls shall be less than 25% of the wall length for Life Safety and 15% of the wall length for Immediate Occupancy.	Eight of eleven shearwalls have adjacent openings that range from 30% to 90% of the total wall length.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4.5.1.7	PLAN IRREGULARITIES: There shall be tensile capacity to develop the strength of the diaphragm at re-entrant corners or other locations of plan irregularities. This statement shall apply to the Immediate Occupancy Performance Level only.	

Building Name: SeaTac City Hall

Date: May 15, 2007

Building Address: 4800 South 188th Street, SeaTac, WA

Page: 2 of 2

Job Number: 6402 Job Name: SeaTac City Hall Evaluation

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## ASCE 31 SUPPLEMENTAL CHECKLIST C2: CONCRETE SHEAR WALL BUILDINGS WITH RIGID OR STIFF DIAPHRAGMS

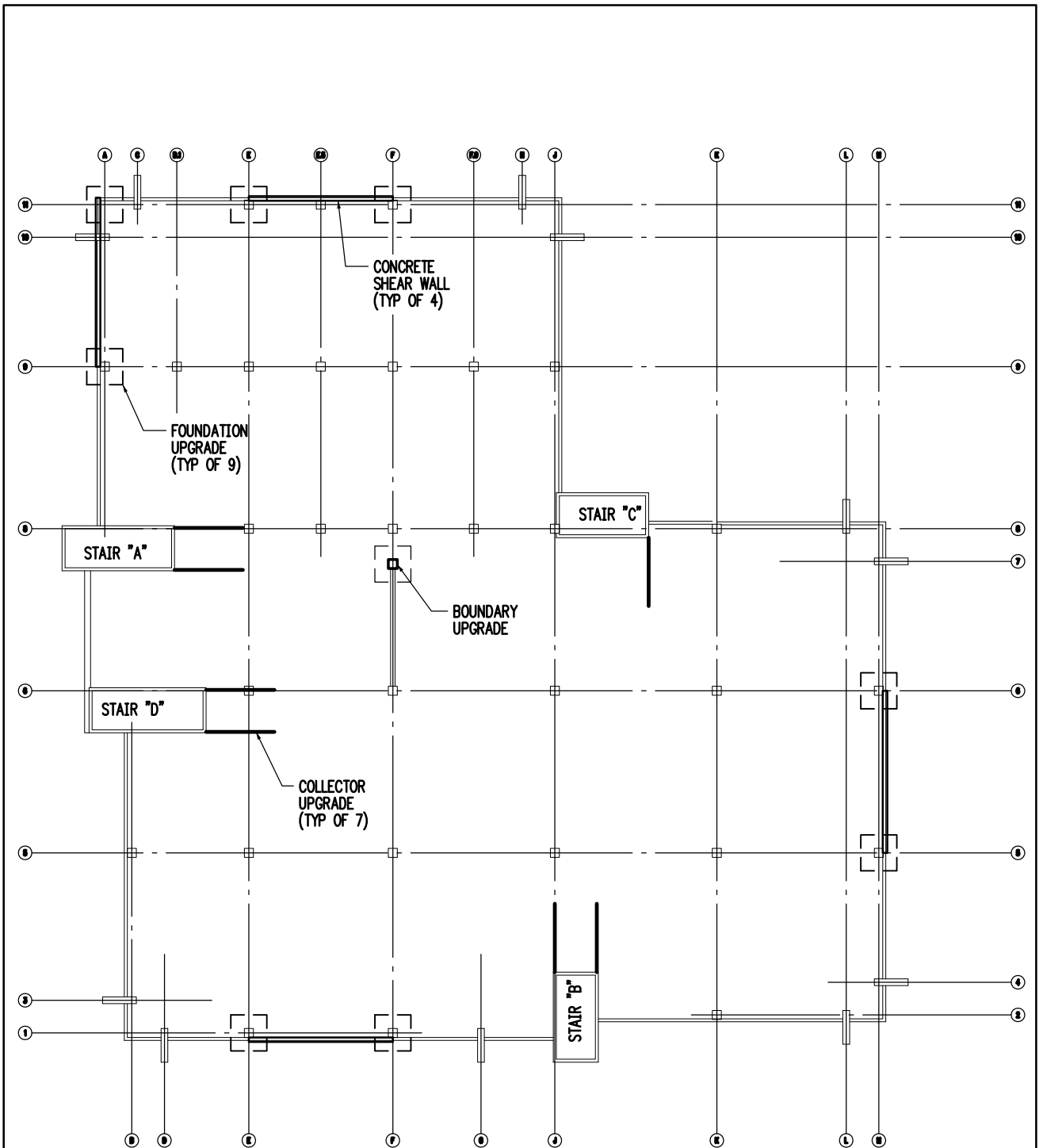
C	NC	N/A	Comments
<b>DIAPHRAGMS</b>			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>4.5.1.8 DIAPHRAGM REINFORCEMENT AT OPENINGS: There shall be reinforcing around all diaphragm openings larger than 50% of the building width in either major plan dimension. This statement shall apply to the Immediate Occupancy Performance Level only.</p>
<b>CONNECTIONS</b>			
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>4.6.3.10 UPLIFT AT PILE CAPS: Pile caps shall have top reinforcement and piles shall be anchored to the pile caps for Life Safety, and the pile cap reinforcement and pile anchorage shall be able to develop the tensile capacity of the piles for Immediate Occupancy.</p> <p><b>There are no piles used in the foundation.</b></p>



SeaTac City Hall  
Seismic Evaluation  
SeaTac, Washington

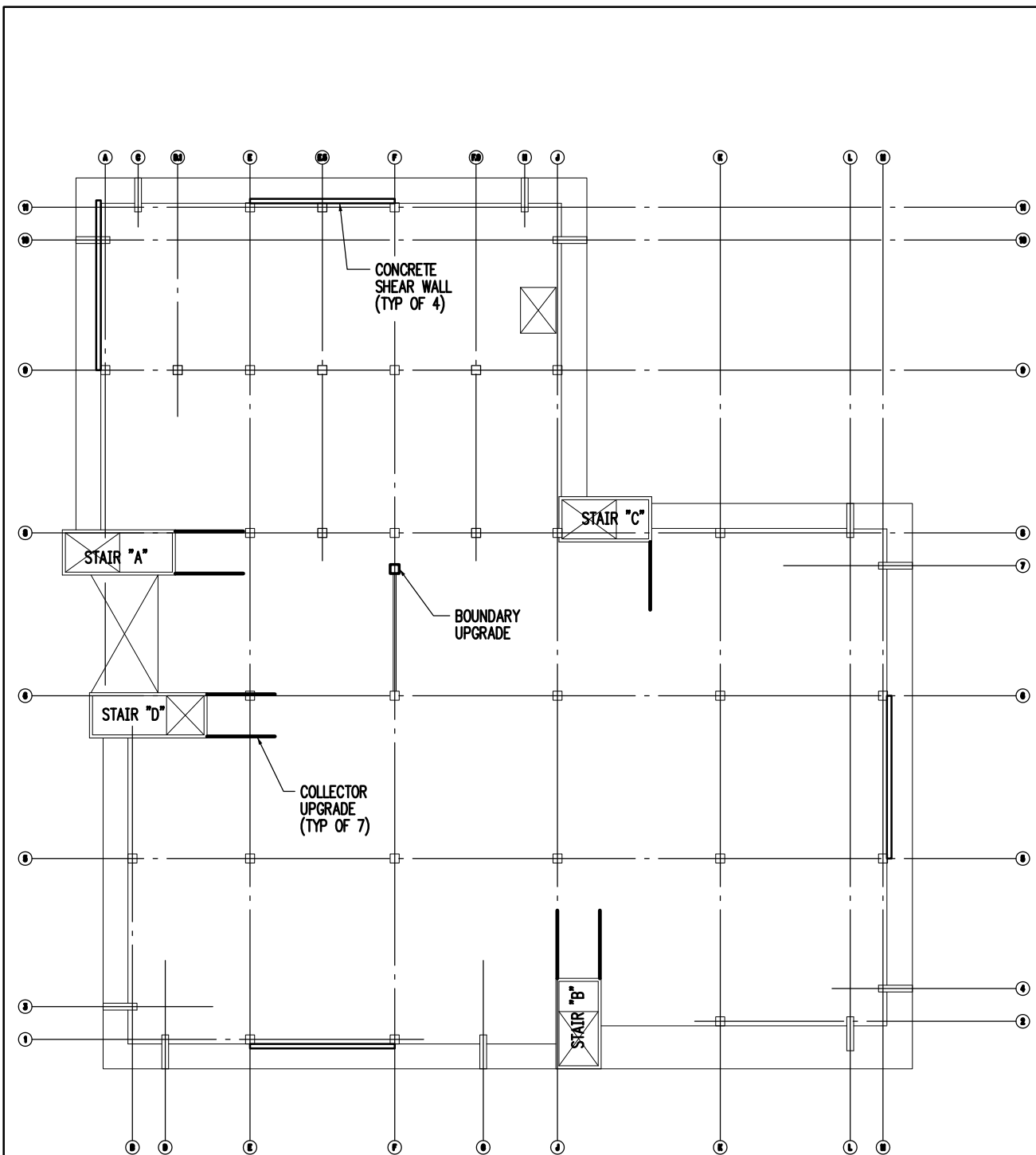
## Appendix D Repair Sketches

Repair Sketches for Upgrading  
to an  
Immediate Occupancy Performance Level  
Using Concrete Shear Walls



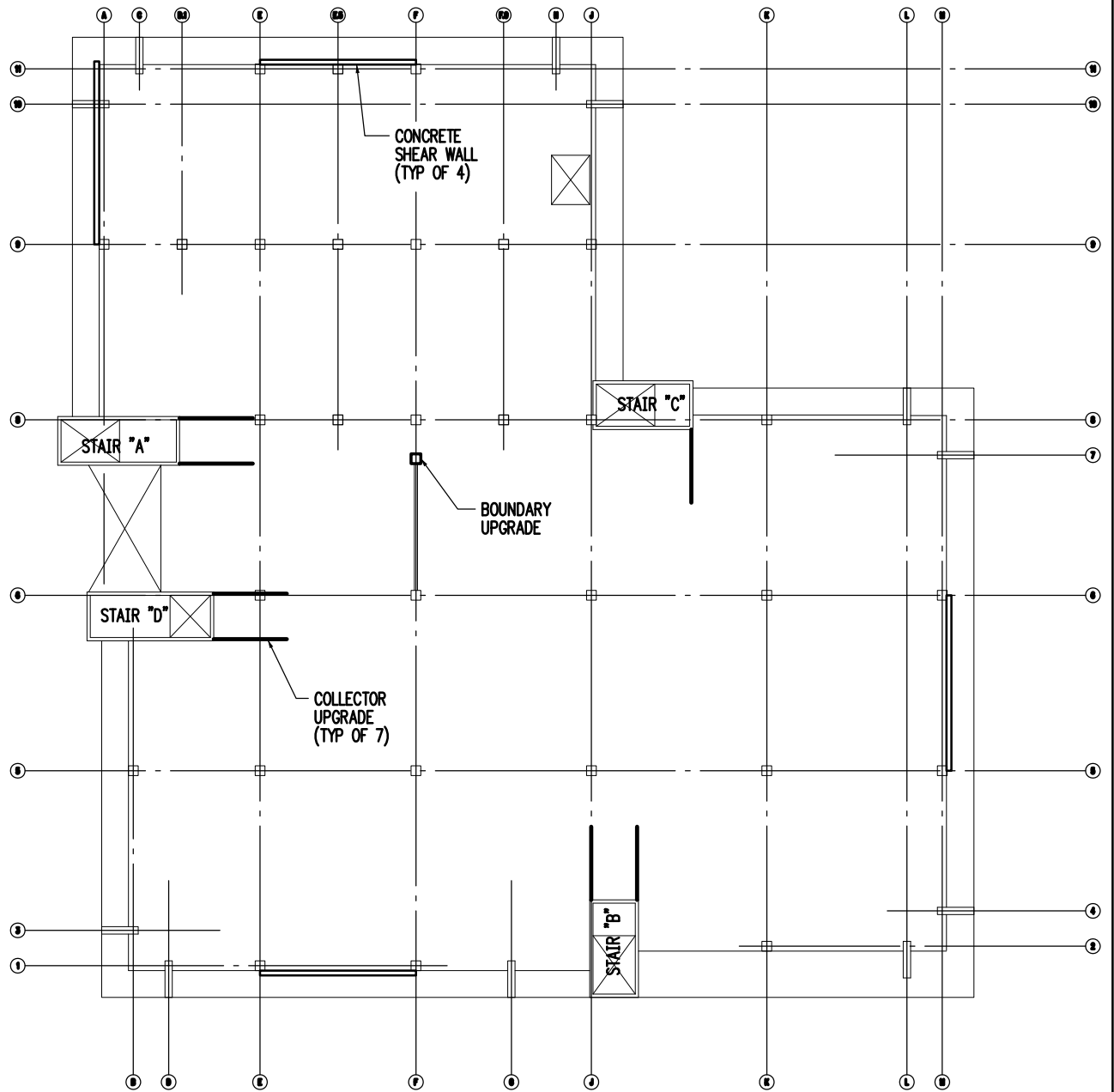
Existing First Floor Plan

Figure D-1



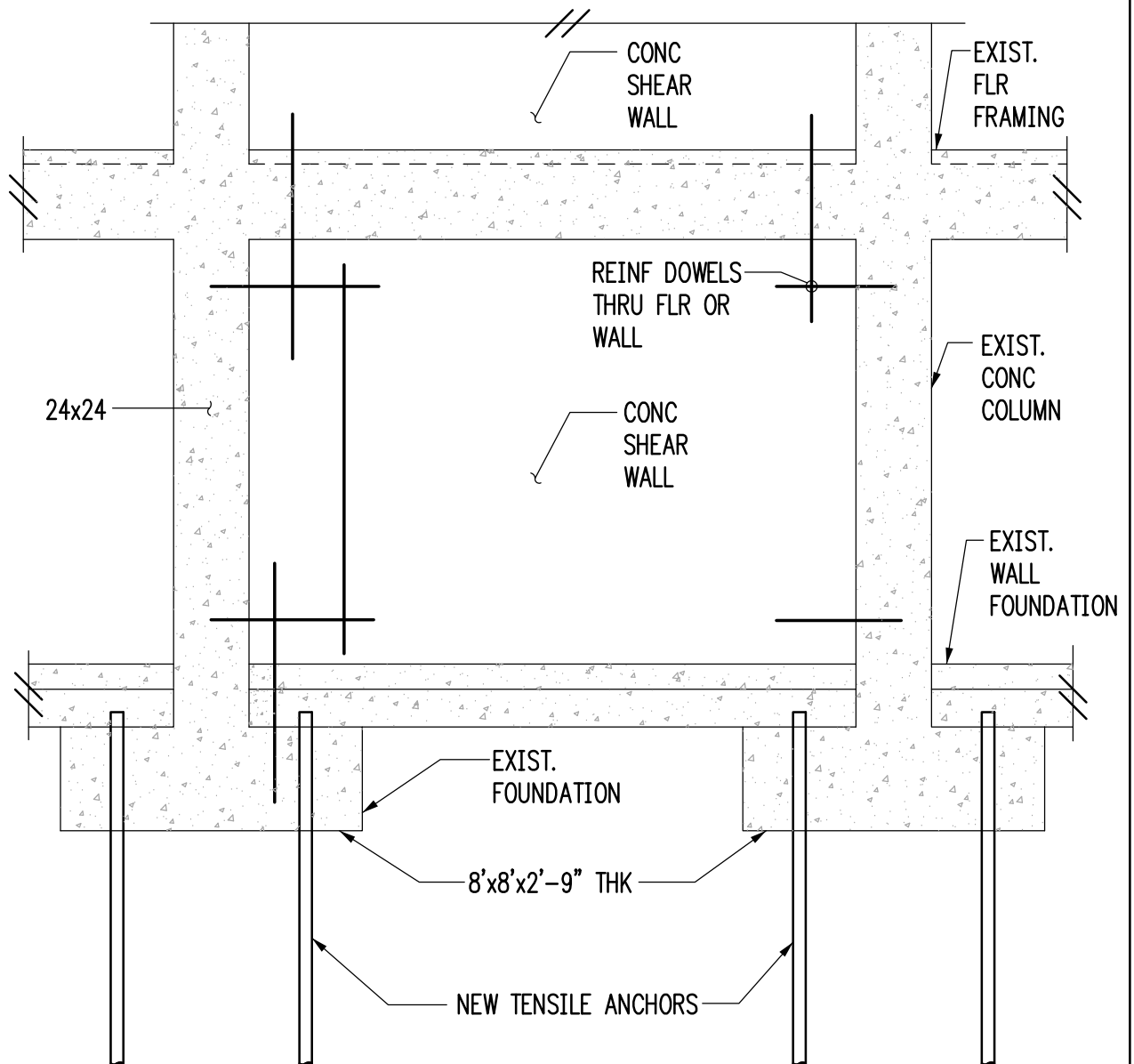
Second Floor Plan

Figure D-2



Third Floor Plan

Figure D-3

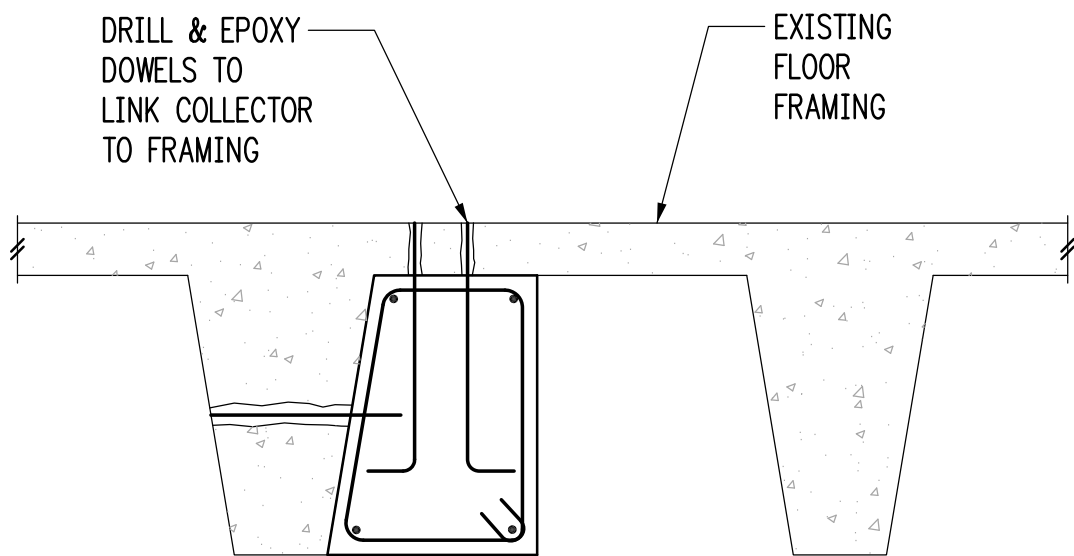


## TYPICAL CONCRETE SHEAR WALL

SCALE NTS

D-4

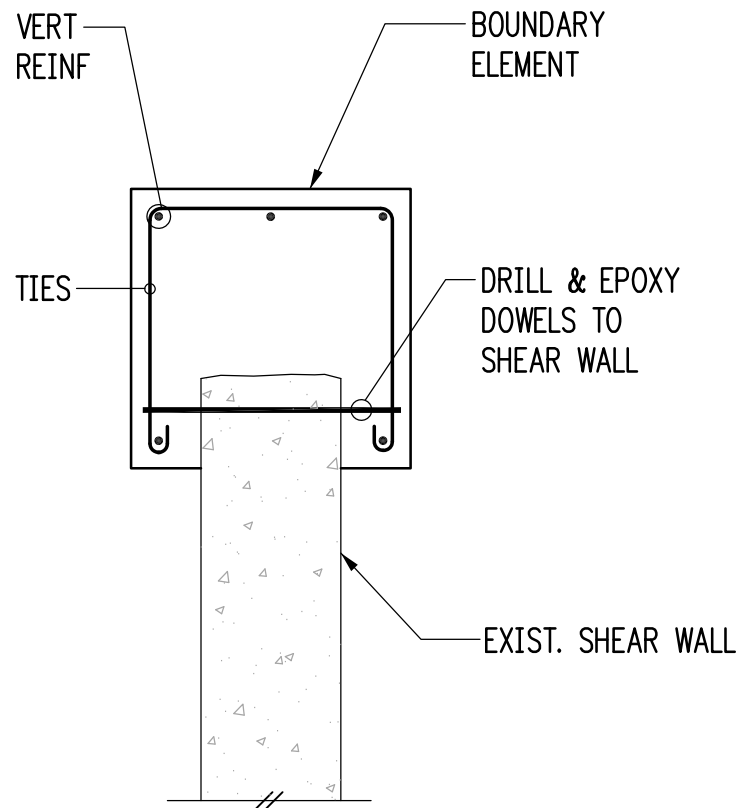




## COLLECTOR DETAIL

SCALE  $\frac{3}{4}"=1'-0"$

D-5



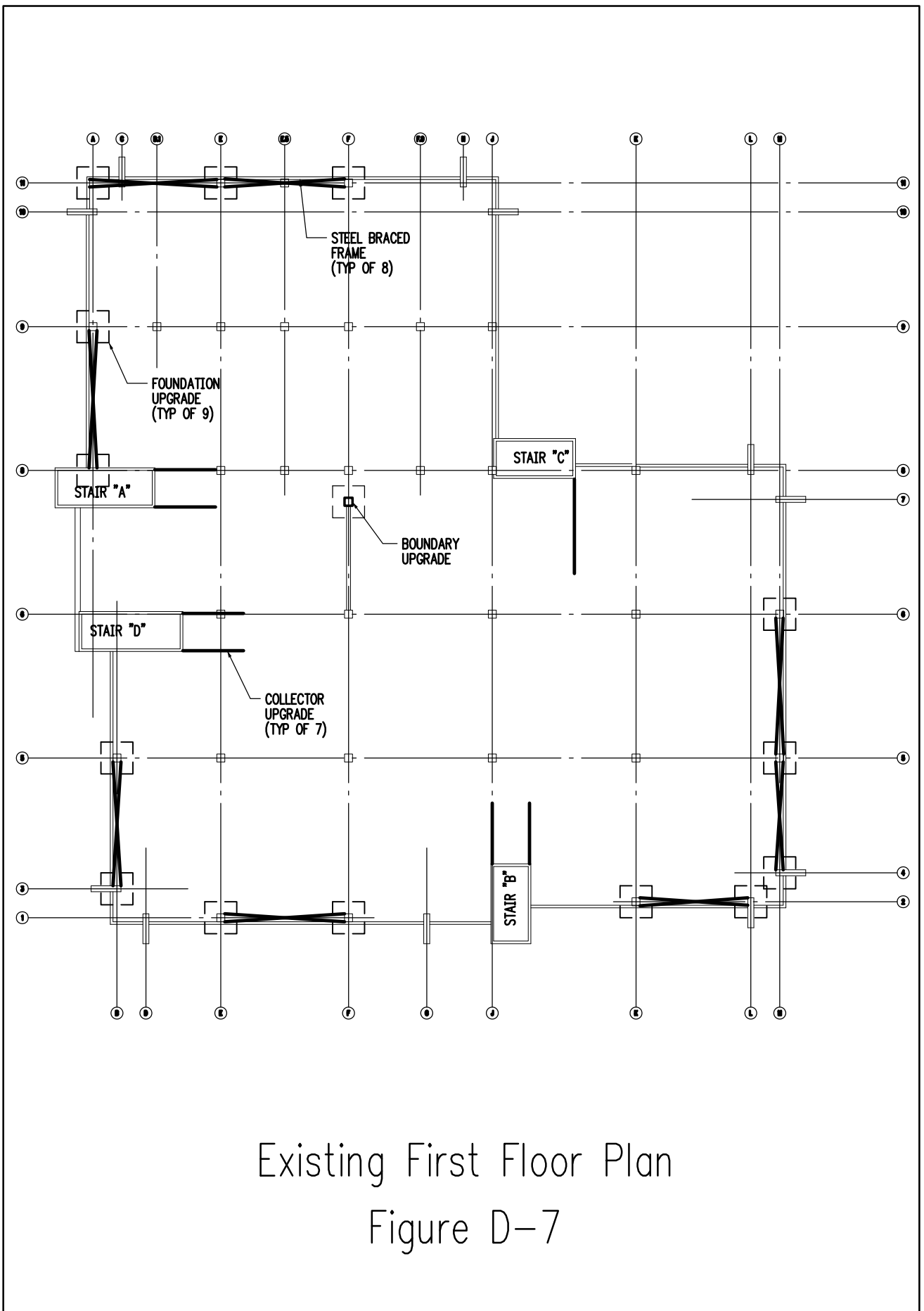
## BOUNDARY UPGRADE

SCALE  $\frac{3}{4}" = 1'-0"$

D-6

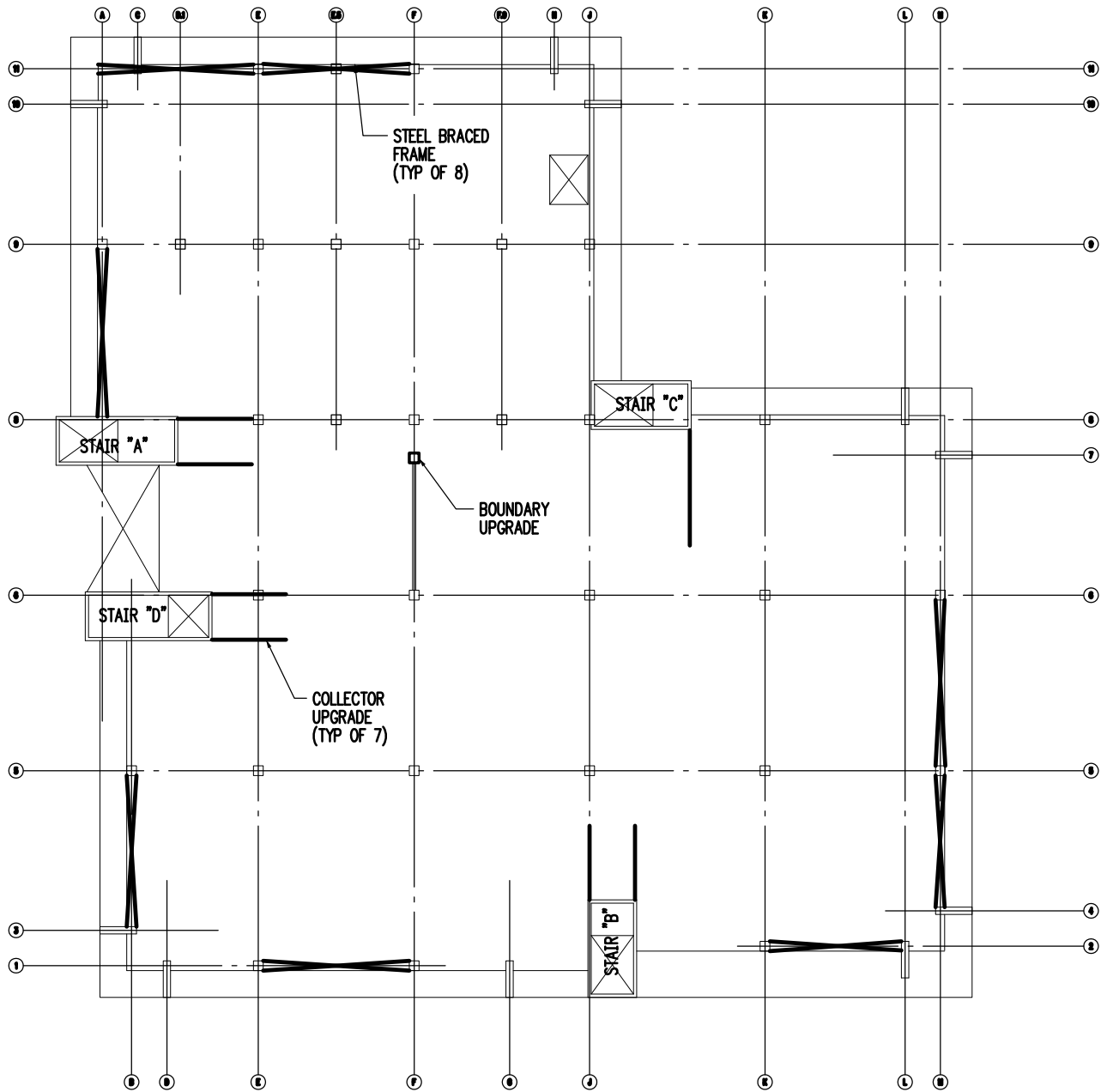
Repair Sketches for Upgrading  
to an  
Life Safety Performance Level  
Using Steel Braced Frames

The sketches for upgrading the building to Life Safety using concrete shear walls are not included. The sketches will be similar to the Immediate Occupancy Upgrade.

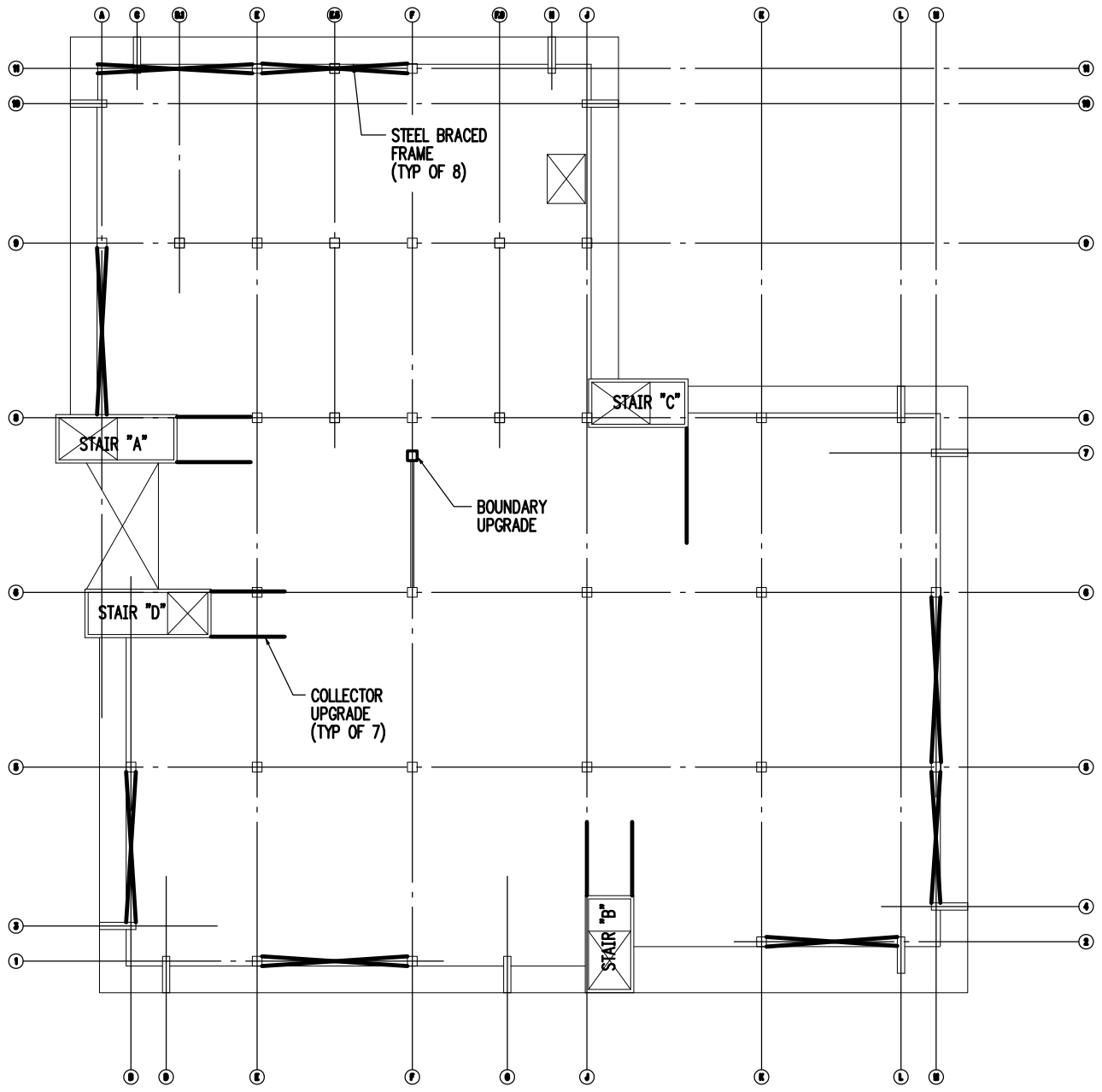


Existing First Floor Plan

Figure D-7



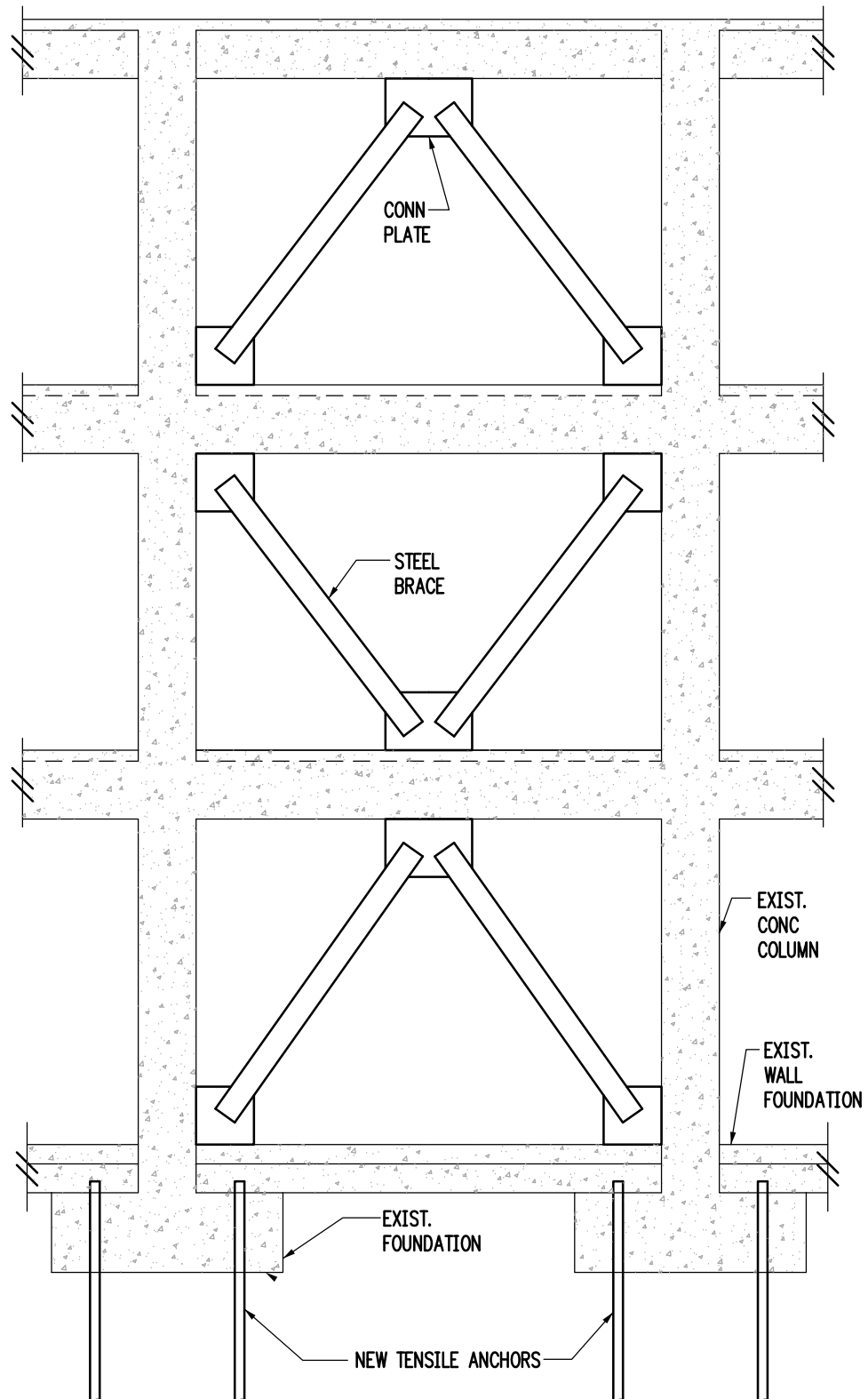
Existing Second Floor Plan  
Figure D-8



Existing Third Floor Plan

Figure D-9





**BRACE ELEVATION**  
SCALE NTS

SeaTac City Hall  
Seismic Evaluation  
SeaTac, Washington

## Appendix E Calculations

## **TIER 1 ANALYSIS**

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JOB SeaTac C.H.

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY DP DATE 5/21/07

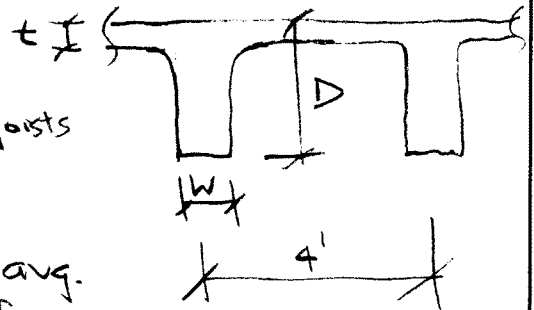
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

## Building weight

### Typical floor construction

$t = 4\frac{1}{2}"$  also  $28.5" \times 30"$  beams  
 $D = 20.5"$  @ 36' O.C.  $\perp$  to joists  
 $W = 8"$



avg. wt =  $.75'(150) = 113$  psf avg.  
+ 1 psf flooring  
+ 1 psf ATC  
+ 2 psf mech/elec/misc.

$\Sigma$  117 psf  
+ 20 psf partitions  
137 psf

Exterior walls - glazing & lt. ga. metal  
assume 10 psf

Building perimeter =  $2(108' + 170') = 716$  ft

Avg. floor ht  $\approx 13'$

Avg wt/floor =  $10 \text{ psf}(13')(716') \div 26776 \text{ sf} = 3.5 \text{ psf}$

$\therefore$  Total avg. floor wt = 140 psf

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JOB Seator C.H.

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY DP DATE 5/21/07

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

Building weight (cont)

Typical roof construction

$$t = 3\frac{1}{2}"$$

(other concrete dims same as floor)

$$\text{avg. wt} = .67'(150) = 100 \text{ psf}$$

+ 3 psf  $1\frac{1}{2}"$  rigid insulation

+ 2 psf built-up aggregate  
roofing

+ 1 psf ATC

+ 4 psf mech/elec/misc/  
penthouse

110 psf

Exterior walls

$$3.5 \text{ psf} / 2 = 2 \text{ psf}$$

$$\therefore \text{Total avg. roof wt} = \boxed{112 \text{ psf}}$$

**MCE Ground Motion - Conterminous 48 States**

Latitude = 47.4300, Longitude = -122.2700

Period      MCE Sa

(sec)          (%g)

0.2          131.3      MCE Value of Ss, Site Class B

1.0          045.0      MCE Value of S1, Site Class B

**Spectral Parameters for Site Class D**

0.2          131.3      Sa = FaSs, Fa = 1.00

1.0          069.8      Sa = FvS1, Fv = 1.55

**Spectrum for Site Class D**

Period      MCE Sa

(sec)          (%g)

0.000      052.5      T = 0.0, Sa = 0.4FaSs

0.106      131.3      T = To, Sa = FaSs

0.200      131.3      T = 0.2, Sa = FaSs

0.531      131.3      T = Ts, Sa = FaSs

0.600      116.3

0.700      099.7

0.800      087.2

0.900      077.5

1.000      069.8      T = 1.0, Sa = FvS1

1.100      063.4

1.200      058.1

1.300      053.7

1.400      049.8

1.500      046.5

1.600      043.6

1.700      041.0

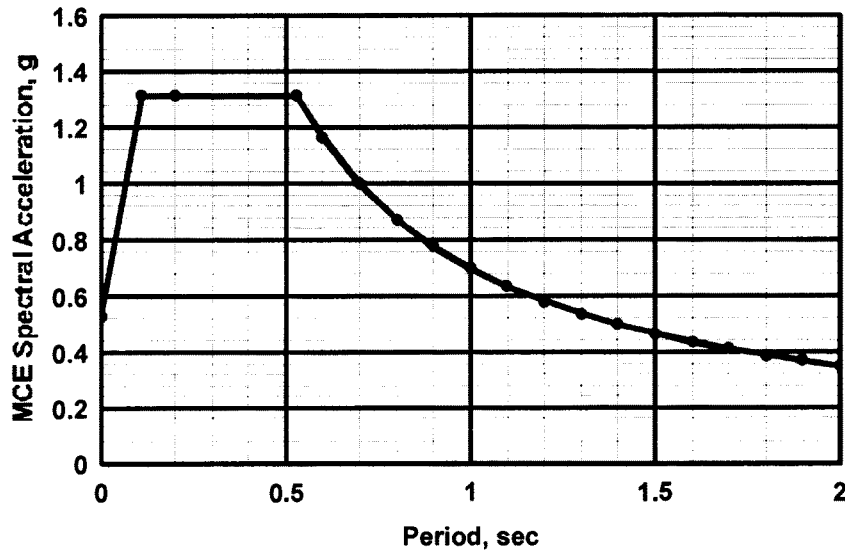
1.800      038.8

1.900      036.7

2.000      034.9



Maximum Considered Earthquake Ground Motion  
 Site Class D       $F_a = 1.00$        $F_v = 1.55$   
 Latitude = 47.4300 deg    Longitude = -122.2700 deg



Period, sec	MCE Sa, g
0.00	0.525
0.11	1.313
0.20	1.313
0.53	1.313
0.60	1.163
0.70	0.997
0.80	0.872
0.90	0.775
1.00	0.698
1.10	0.634
1.20	0.581
1.30	0.537
1.40	0.498
1.50	0.465
1.60	0.436
1.70	0.410
1.80	0.388
1.90	0.367
2.00	0.349

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JOB SeaTac C.H.

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY DP DATE 5/21/07

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

ASCE 31

3.5.2

### Tier 1 Pseudo Lateral Force - ASCE 3102

$$S_s = 1.313 g$$

$$S_1 = .45 g$$

Assume site class D

$$F_a = 1.00$$

$$F_v = 1.55$$

$$S_{D1} = \frac{2}{3} F_v S_1 = .46$$

$$S_{DS} = \frac{2}{3} F_a S_s = .88$$

$$\begin{aligned} T &= C_t h_n^B \\ &= .02 (39')^{.75} \\ &= .31 \end{aligned}$$

$$S_a = S_{D1} / T = .46 / .31 = 1.48$$

$$\text{Max } S_a = S_{DS} = .88 \leftarrow \text{controls}$$

Table 3-4

$$C = 1.1$$

$$V = C S_a W$$

$$= 1.1 (.88) W$$

$$\underline{V = .97 W}$$

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SHEET NO. \_\_\_\_\_

OF \_\_\_\_\_

CALCULATED BY DP

DATE 5/21/07

CHECKED BY \_\_\_\_\_

DATE \_\_\_\_\_

SCALE \_\_\_\_\_

### Weights

Roof:  $112 \text{ psf} (26800 \text{ sf}) = 3000^k$

3rd flr:  $140 \text{ psf} (26800 \text{ sf}) = 3750^k$

2nd flr:  $140 \text{ psf} (26800 \text{ sf})$

Storage Area  $\rightarrow + .25 (250 \text{ psf}) (74') (98') = 4200^k$   
 $\Sigma 10950^k$

$V = .97 (10950^k) = 10620^k$  Base Shear

ASCE 31

3.5.2.2

### Story Shears

Story	$W_x$	$h_x$	$W_x h_x^k$	$\frac{W_x h_x^k}{\Sigma W_i h_i^k} \times V$	$V_i$
Roof	$3000^k$	39'	117000	.43	4567 <sup>k</sup>
3	3750	26'	97500	.36	3823 <sup>k</sup>
2	4200	13.5'	56700	.21	2230 <sup>k</sup>
			$\Sigma 271200$		$\Sigma 10620$

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SCALE \_\_\_\_\_

ASCE 31 Shear stress in shear walls  $2\sqrt{f'_c} = 126 \text{ psi}$

3.5.3.3 
$$V_j^{avg} = \frac{1}{m} \left( \frac{V_u}{A_w} \right)$$

table 3-7  $m = 2$

N-S walls:

$$A_w = 8'' (10' + 10' + 20' + 20') \left( \frac{12''}{ft} \right) + 12'' (28') \left( \frac{12''}{ft} \right) \\ = 9792 \text{ in}^2$$

$$V_j^{avg} = \frac{1}{2} \left( \frac{10620}{9792} \right) = 542 \text{ psi} > 126 \text{ psi N.G.}$$

E-W walls:

$$A_w = 8'' \left[ (2)(25' + 26') + 20' \right] 12 \\ = 11712 \text{ in}^2$$

$$V_j^{avg} = \frac{1}{2} \left( \frac{10620}{11712} \right) = 453 \text{ psi} > 126 \text{ N.G.}$$

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OF \_\_\_\_\_

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DATE \_\_\_\_\_

SCALE \_\_\_\_\_

Transfer to shear walls

Diaphragm:  $t = 4\frac{1}{2}"$   $f'_c = 4000$

reinf: 6x6 W1.4-W1.4 WWF  
(assume 65 ksi)

ACL  
21.9.7.1

$$\begin{aligned}\phi V_n &= \phi A_{cv} (2\sqrt{f'_c} + \rho_n f_y) \\ &= .75 [4.5" (12") (2\sqrt{4000}) + .03 \text{ in}^2/\text{ft} (65 \text{ ksi})] \\ &= 6.6 \text{ klf}\end{aligned}$$

Dowels to wall: #5 @ 8",  $f_y = 60 \text{ ksi}$

$$\begin{aligned}\phi V_n &= \phi A_{vf} f_y u \\ &= .75 (.46 \text{ in}^2/\text{ft}) (60 \text{ ksi}) (.6) \\ &= 12.4 \text{ klf} > 6.6 \checkmark \quad \underline{\text{OK}}\end{aligned}$$

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Foundation dowels

Assume wall reinforcing is developed into footing

8" walls w/ #4 @ 15" o.c.

$$\phi V_n = \phi A_{cv} (\phi_c \sqrt{f'_c} + \rho_n f_y)$$

$$= .75 [ (8") (12") (2 \sqrt{4000}) + .16 \frac{\text{in}^2 \text{ft}}{\text{ft}} (60) ]$$

$$= 16.3 \text{ klf} \quad \text{WALL STRENGTH}$$

ACI 318  
26.7.4.1

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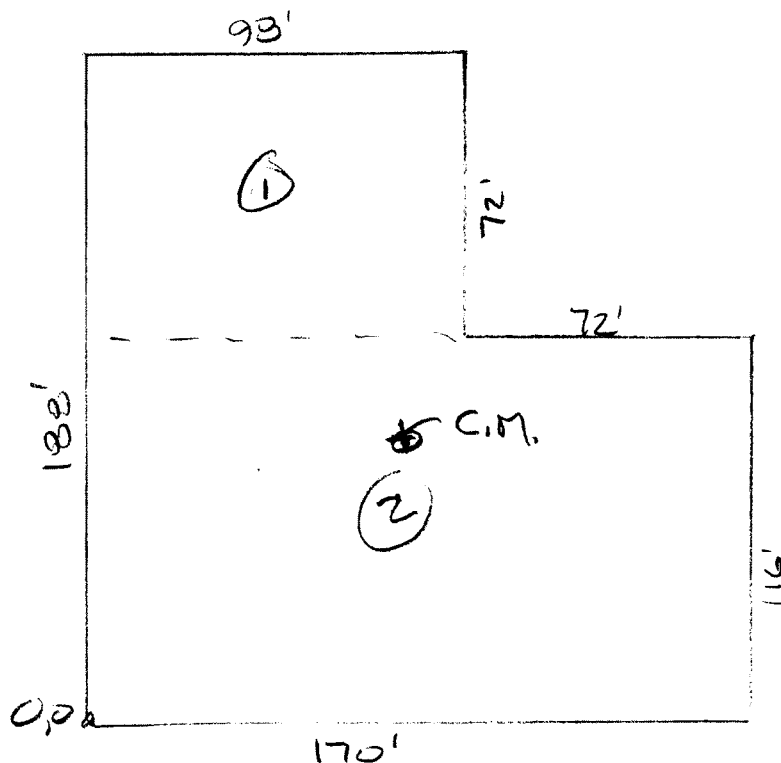
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY DP DATE 5/21/07

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

Center of mass



	<u>Area</u>	<u>X</u>	<u>Ax</u>	<u>y</u>	<u>Ay</u>
①	7056	49'	345744	152	1072512
②	19720	85'	1676200	58	1143760
	<u>Σ 26776</u>		<u>Σ 2021944</u>		<u>Σ 2216272</u>
	$\bar{x} = 76'$			$\bar{y} = 83$	



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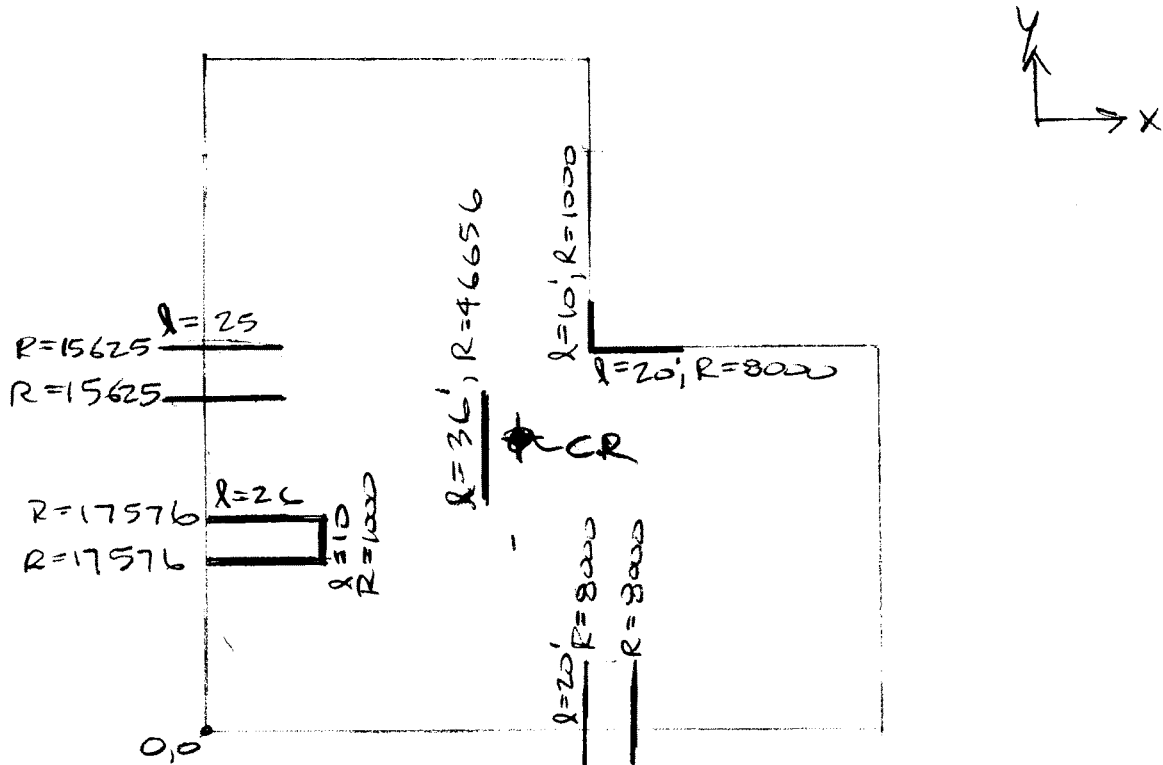
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

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SCALE \_\_\_\_\_

Center of rigidity



C.R.

$$X: \frac{16(1000) + 46656(66') + 1000(102') + 8000[102' + 112']}{2(1000) + 46656 + 2(8000)} = 76'$$

$$Y: \frac{17576[68' + 78'] + 15625[105' + 115'] + 8000(111')}{2(17576 + 15625) + 8000} = 93'$$

C.R.  $\approx$  C.M.

## **TIER 2 ANALYSIS**

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ASCE 31  
4.2.3.2

Check for torsional irregularity of 2nd floor using  
RISA deflections

1 N-S +5% case (Y-axis)

JOINT:	61	62	55	37	41	avg
$\Delta y$ :	.37	.63	<u>.82</u>	.39	.82	.61

$$\delta_{\max}/\delta_{\text{avg}} = 1.34 > 1.2$$

$$A_x = \left( \frac{\delta_{\max}}{1.2 \delta_{\text{avg}}} \right)^2 = 1.25 = A_x$$

2 N-S -5% case (Y-axis)

JOINT:	61	62	55	37	41	avg
$\Delta y$ :	<u>1.18</u>	.435	-.103	1.14	-.103	.51

$$\delta_{\max}/\delta_{\text{avg}} = 2.31 > 1.2 \quad \underline{A_x = 3.0 (\text{max})}$$

3 E-W +5% case (X-axis)

JOINT:	61	62	55	37	41	avg
$\Delta x$ :	<u>.918</u>	.918	.401	.37	.38	.40

$$\delta_{\max}/\delta_{\text{avg}} = 1.0 < 1.2 \text{ ok} \quad \underline{A_x = 1.0}$$

4 E-W -5% case (X-axis)

JOINT:	61	62	55	37	41	avg
$\Delta x$ :	-.61	-.61	.176	<u>1.40</u>	1.36	.34

$$\delta_{\max}/\delta_{\text{avg}} = 4.11 > 1.2 \quad \underline{A_x = 3.0 (\text{max})}$$



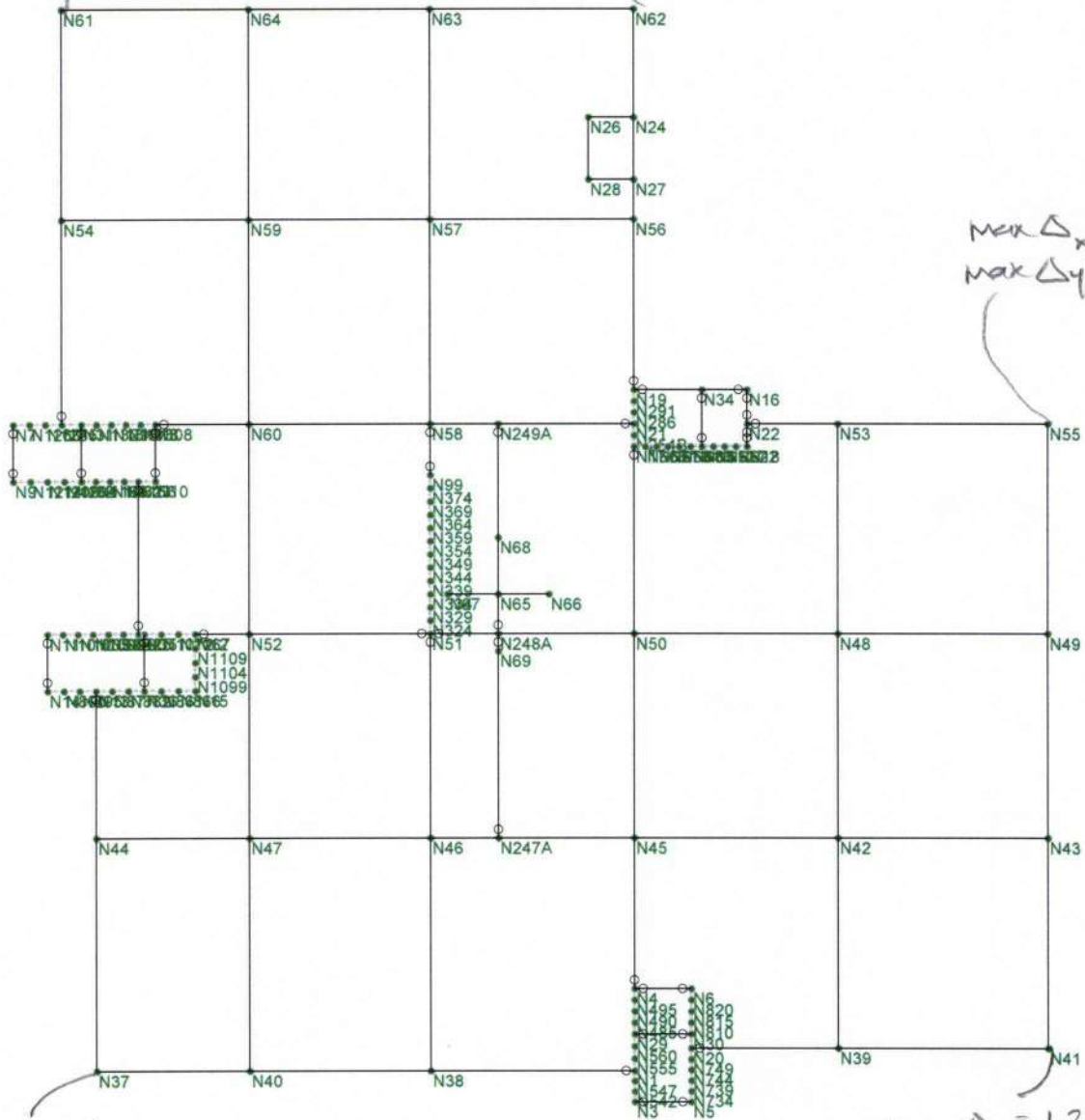
max  $\Delta_x = .42$   
max  $\Delta_y = 1.18$

max  $\Delta_x = .61$   
max  $\Delta_y = .63$

max  $\Delta_x = .40$   
max  $\Delta_y = .82$

max  $\Delta_x = 1.40$   
max  $\Delta_y = 1.14$

max  $\Delta_x = 1.36$   
max  $\Delta_y = .82$



Results for LC 5, n-s base shear

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6402

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May 22, 2007 at 12:01 PM

bldg4.r3d

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SCALE \_\_\_\_\_

Check shearwall capacity

Table 4-6: worst case  $M=1.5$

$$f'_c = 3000 \text{ psi} \times 1.25 = f'_{ce} = 3750 \text{ psi}$$

$$f_y = 60 \text{ ksi} \times 1.25 = f'_{ye} = 75 \text{ ksi}$$

ACI 318

21.7.4

1.02

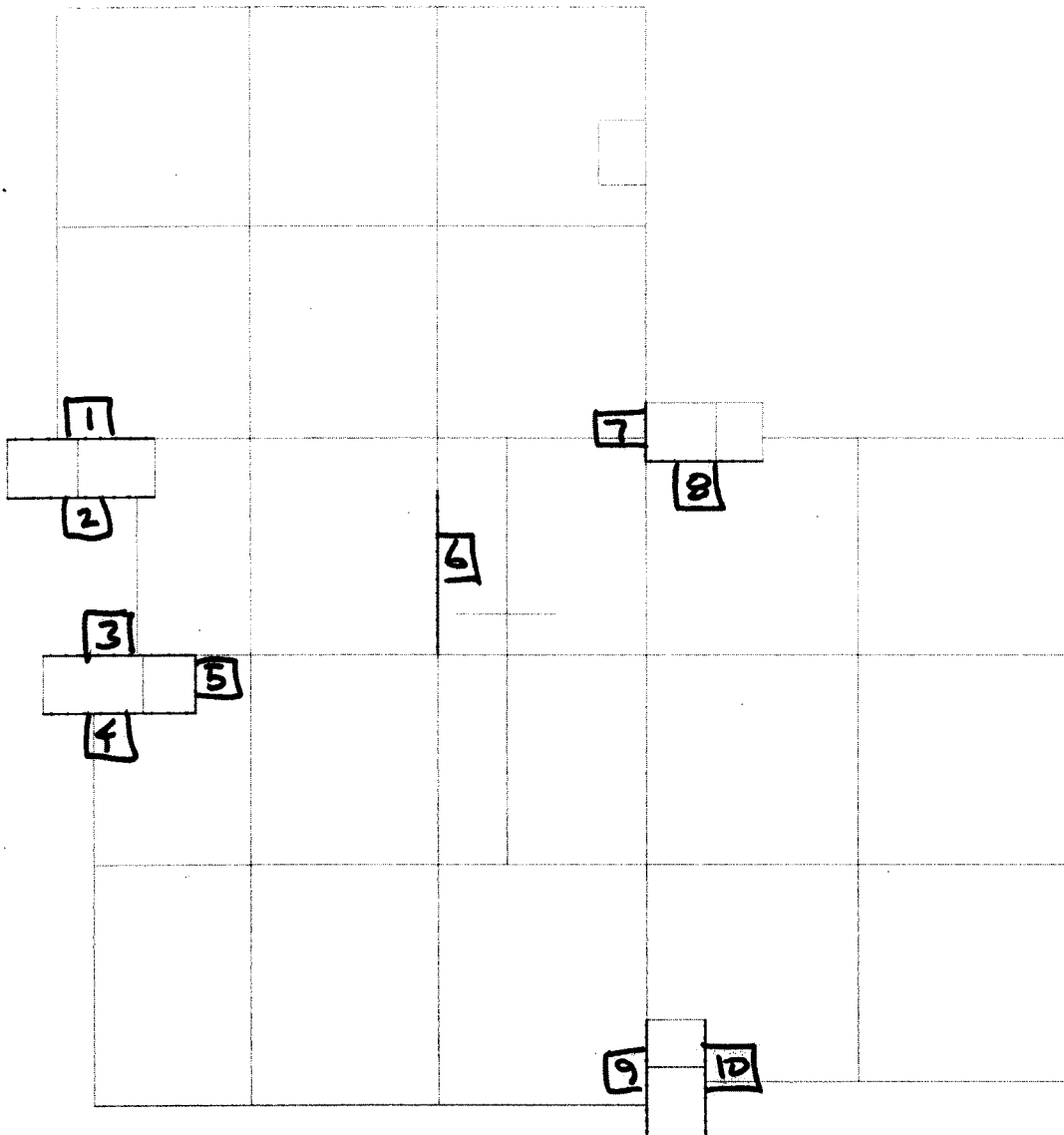
$$\phi V_n = A_{cv} [3\sqrt{f'_c} + \rho_n f_y]$$

$$8" \text{ walls } \#5 @ 15" \quad \rho = .25 \text{ in}^2 / \text{ft} \div [8(12)] = .0026$$

$$V_{ne} = (12" / \text{ft}) (8") [3\sqrt{3750} + .0026(75000)]$$
$$= 36.4 \text{ klf}$$

$$12" \text{ wall } \#6 @ 11" \text{ E.F. } \rho = .81 \div [8(12)] = .0084$$

$$V_{ne} = (12")^2 [3\sqrt{3750} + .0084(75000)]$$
$$= 117 \text{ klf}$$



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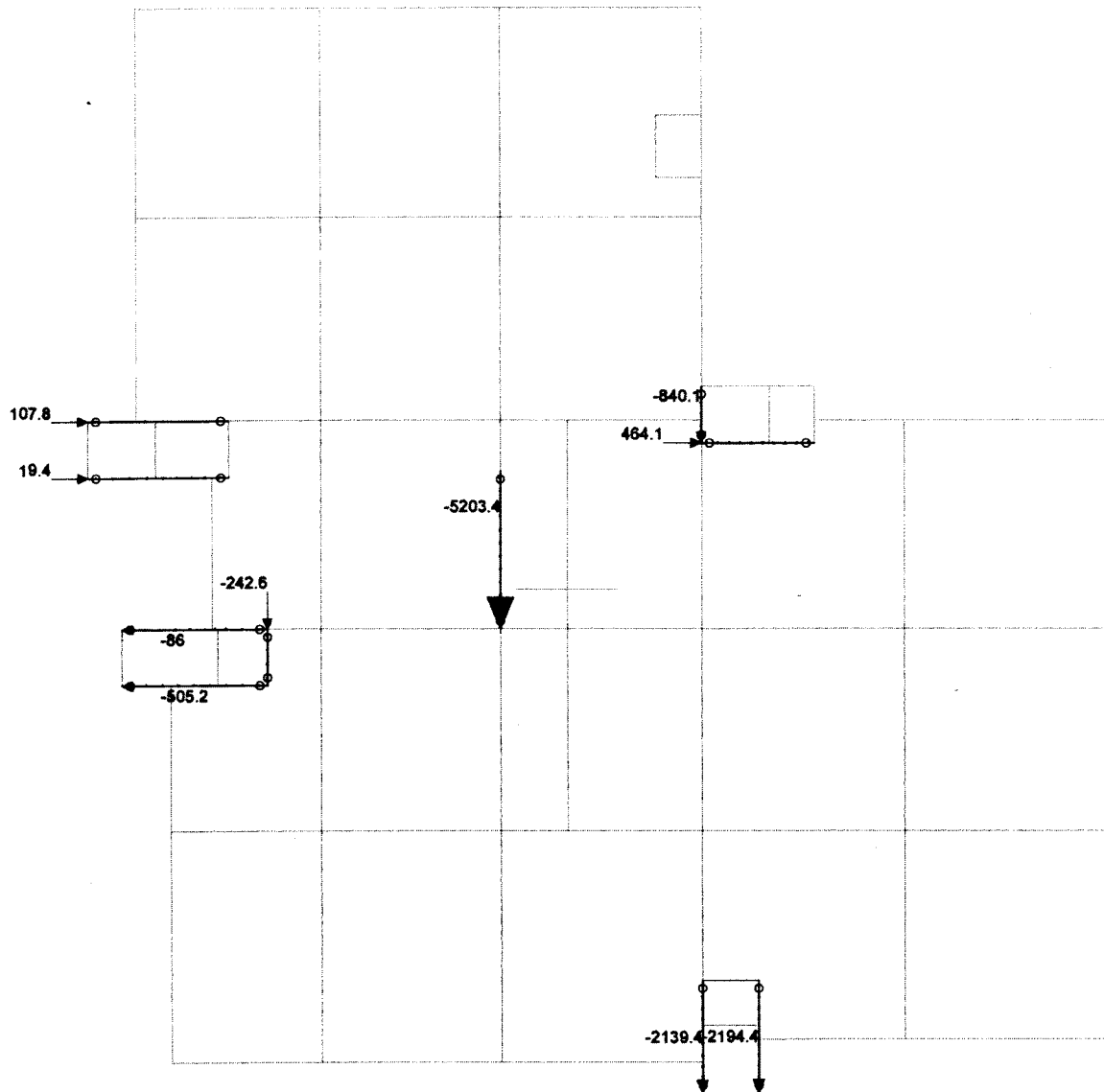
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Results for LC 1, n-s base shear +5%  
Reaction units are k and k-ft

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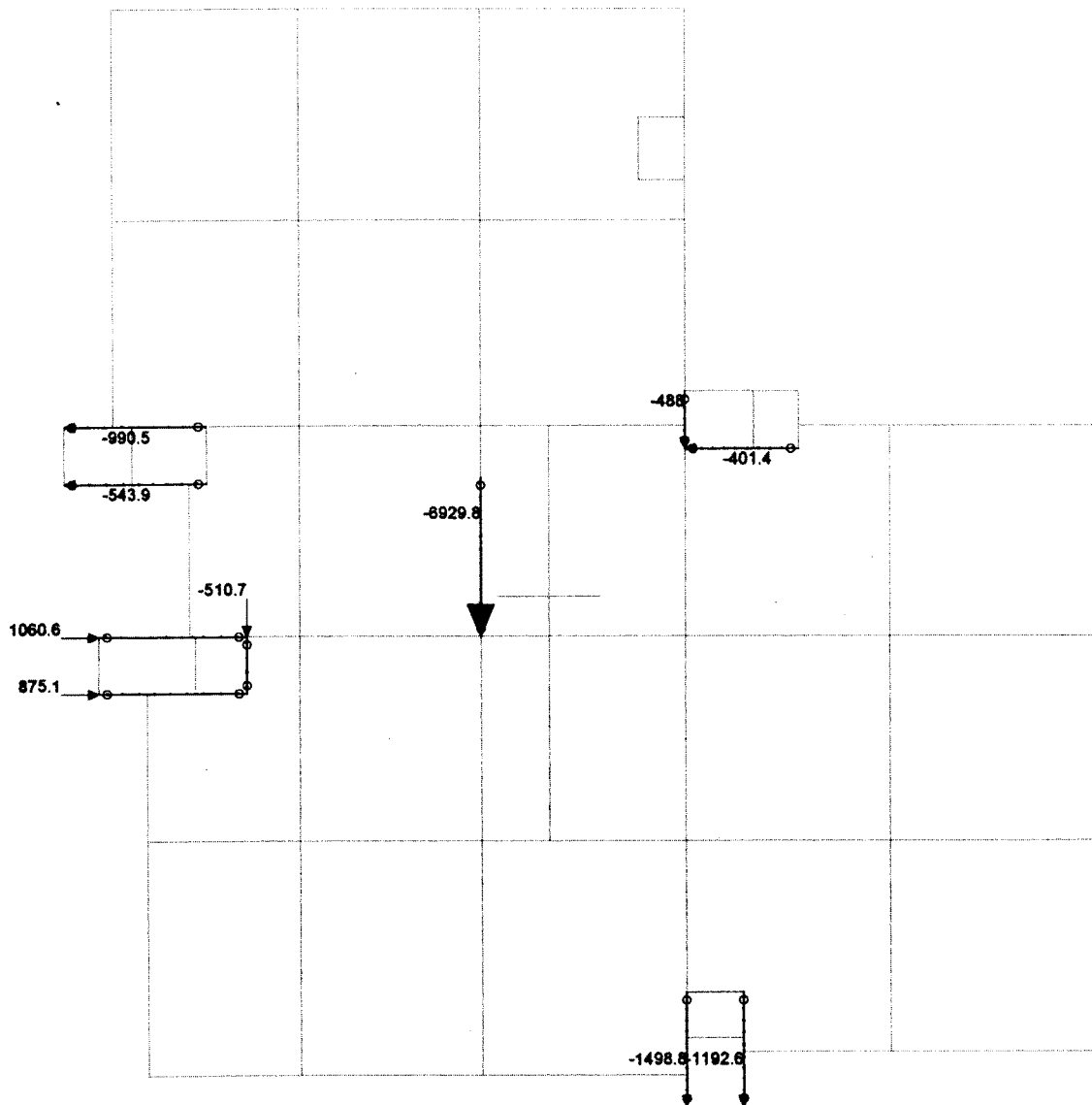
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Results for LC 2, n-s base shear -5%  
Reaction units are k and k-ft

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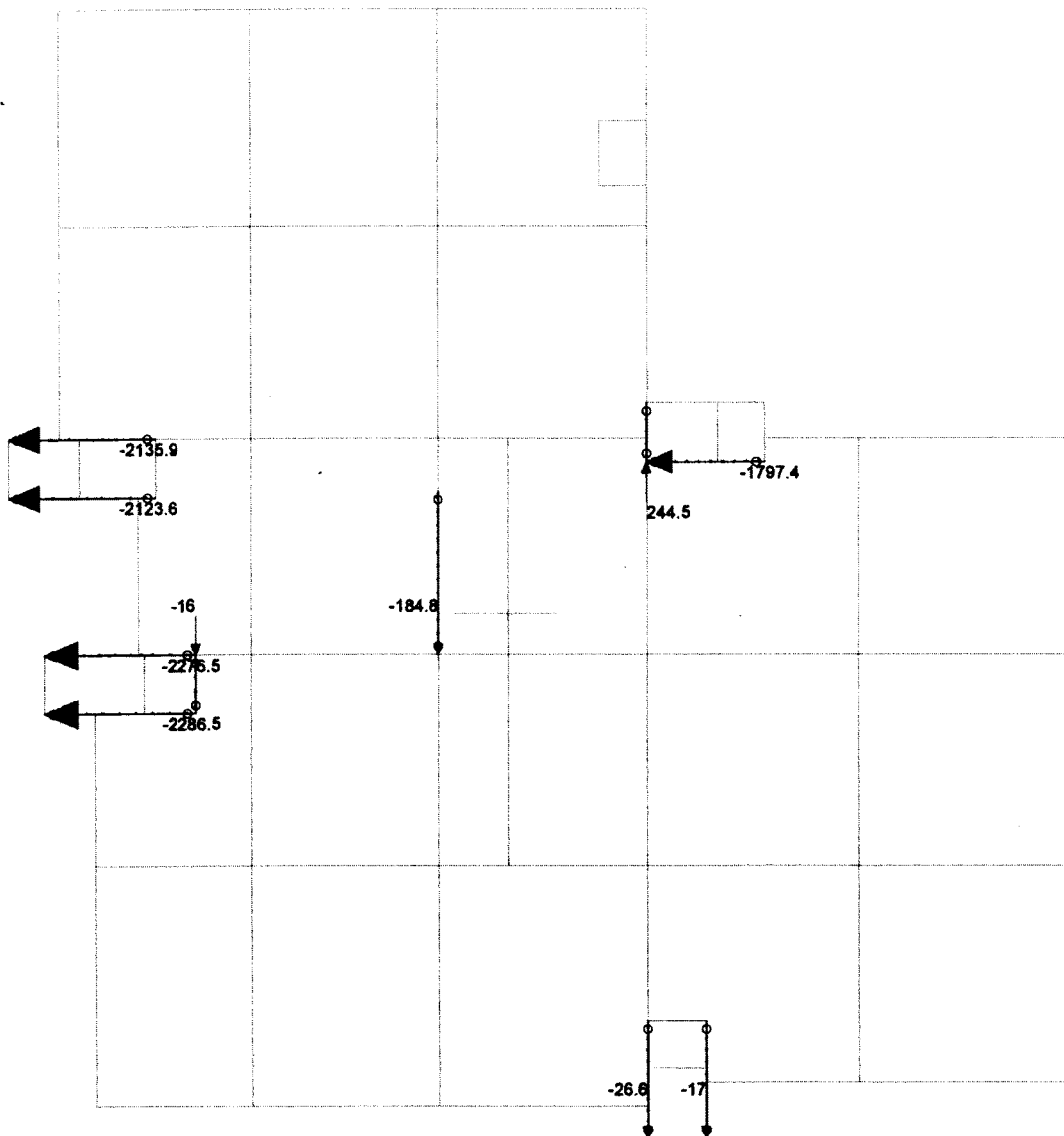
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Results for LC 3, e-w base shear +5%  
Reaction units are k and k-ft

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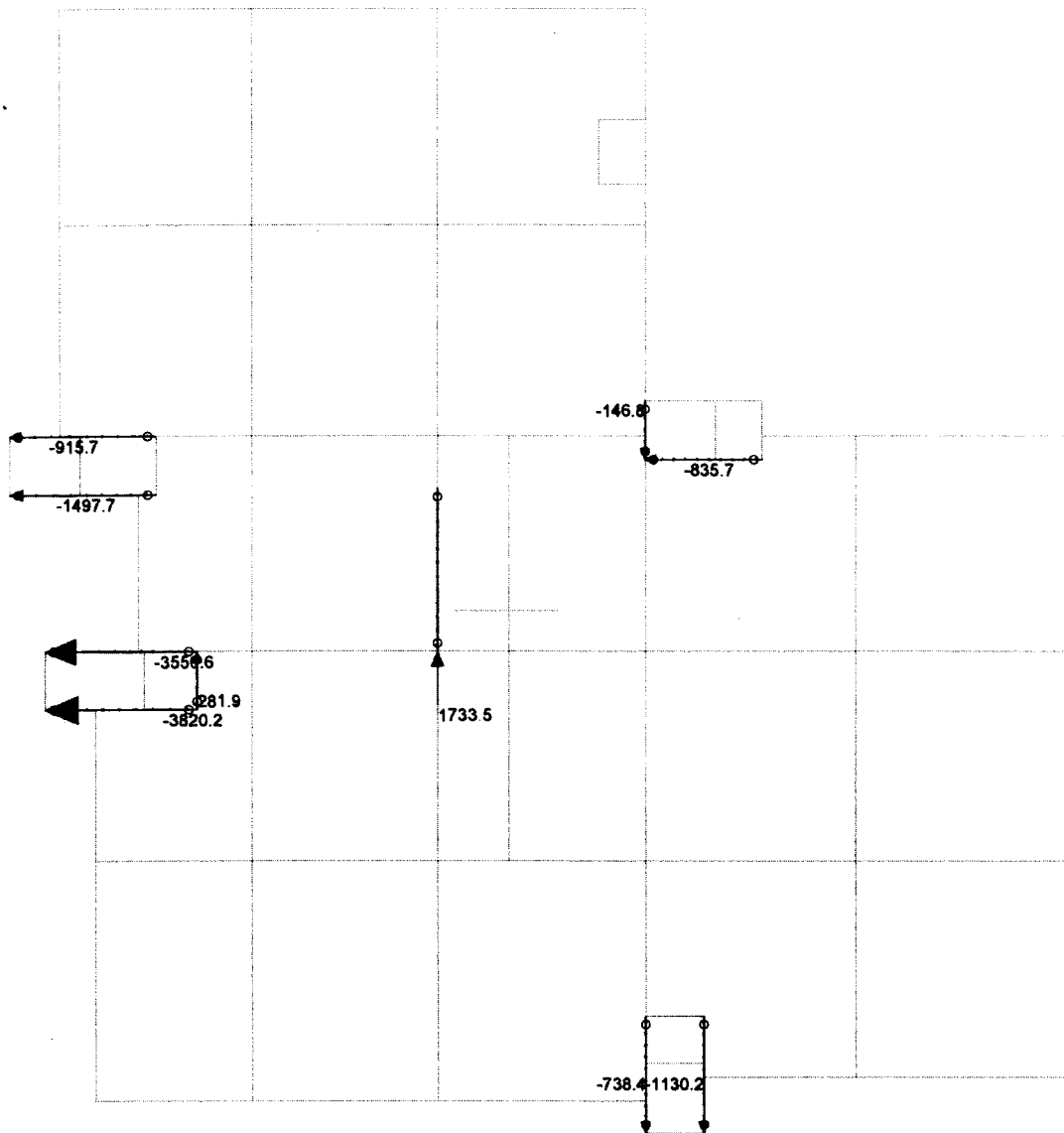
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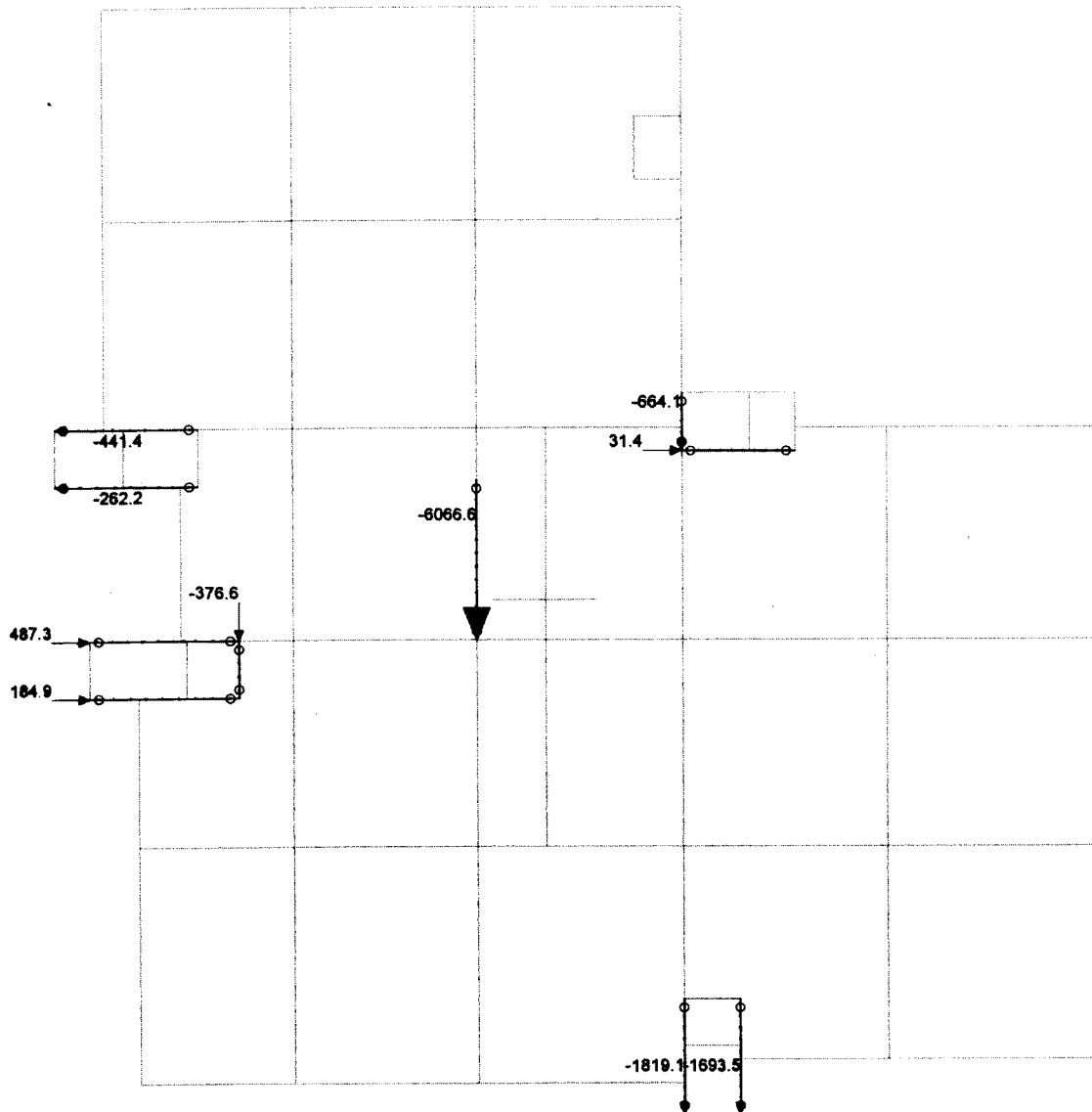
May 21, 2007 at 2:17 PM

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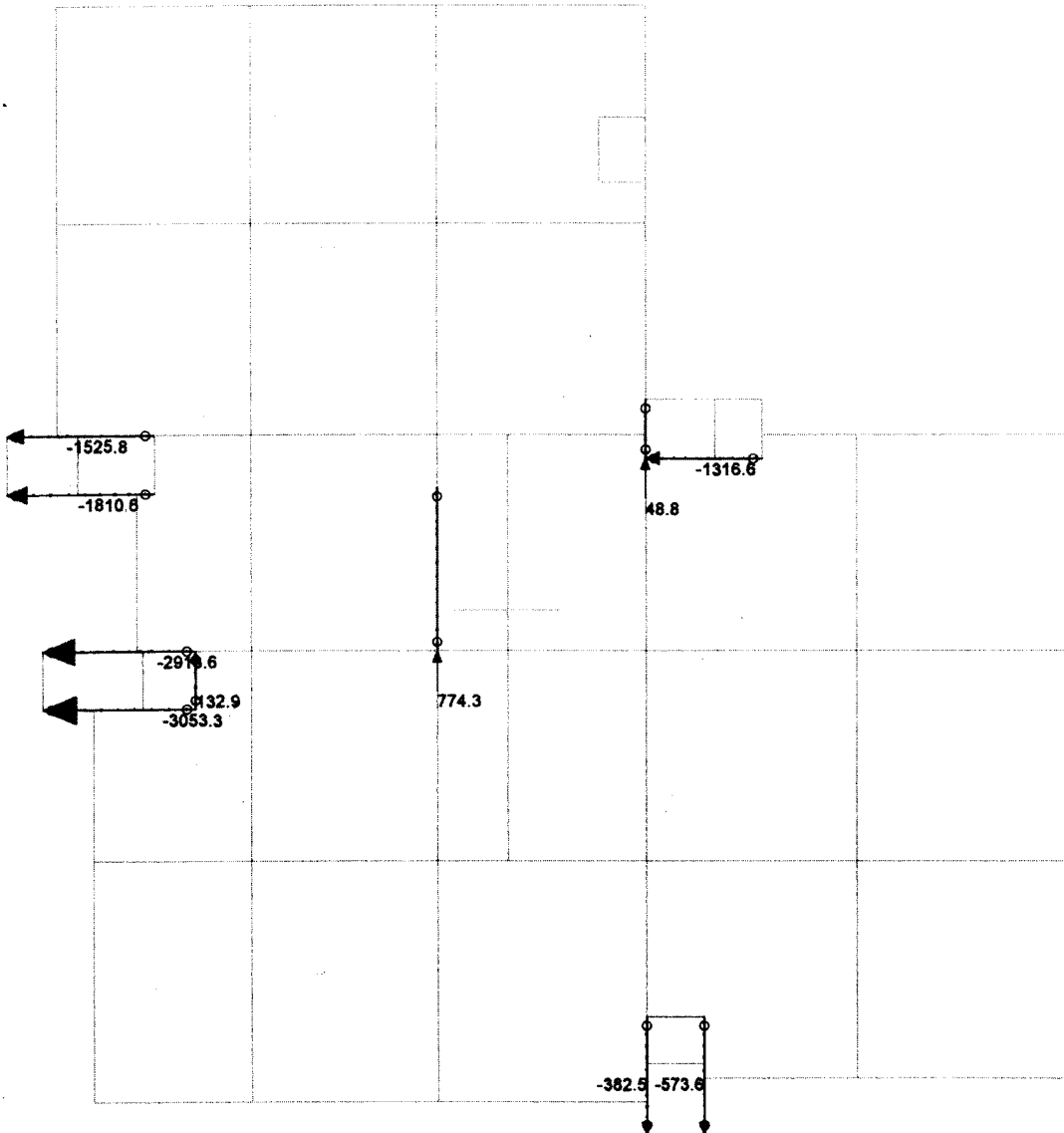
Results for LC 4, e-w base shear -5%  
Reaction units are k and k-ft

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6402		bldg4.r3d



Results for LC 5, n-s base shear  
Reaction units are k and k-ft

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DP		May 21, 2007 at 3:48 PM
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Results for LC 6, e-w base shear  
Reaction units are k and k-ft

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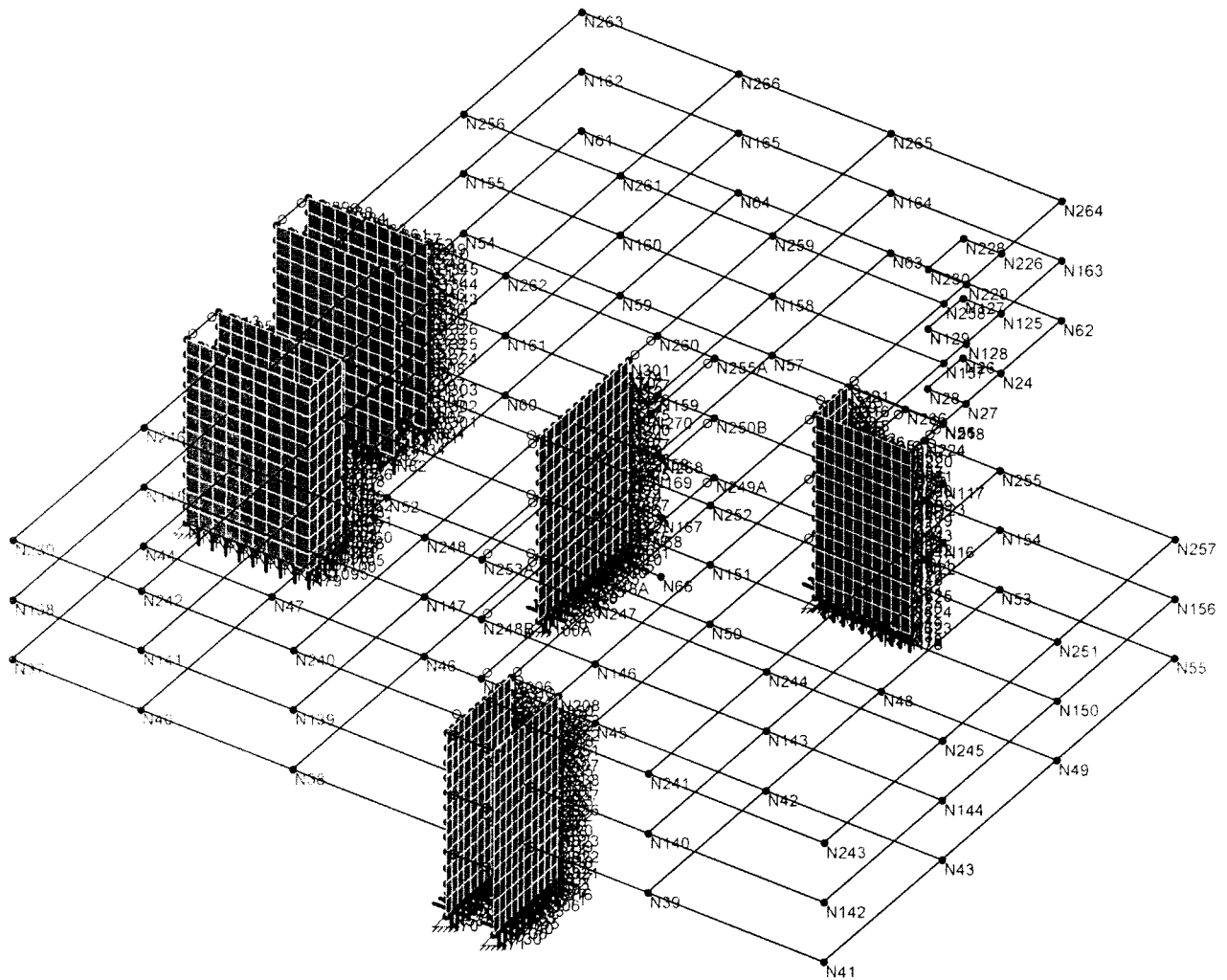
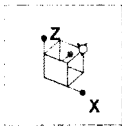
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October 19, 2007

#### NOTE

The RISA data that follows in this pdf file has been condensed from the original printed results in the bound report dated October 11, 2007 to include only data most useful to the reader. **These calculations remain the unchanged.** The original October 11, 2007 printout date has been overwritten by today's date of October 19, 2007.



#### Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation	Yes
Area Varping	Yes
Area Load Mesh (in <sup>2</sup> )	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Vertical Axis	Z

Hot Rolled Steel Code	AISC: ASD 9th
Cold Formed Steel Code	NSI 99: ASD
Wood Code	NDS 91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 2002

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parma Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections	Yes
Bad Framing Warnings	No
Unstayed Force Warnings	Yes

Footing Overturning Safety Factor	1.5
Check Concrete Bearing	Yes
Self Wt. Overburden in DL for Design	No
Footing Concrete Weight	145 k/ft <sup>3</sup>
Footing Concrete f <sub>c</sub>	3 ksi
Footing Concrete E <sub>c</sub>	4000 ksi
Footing Steel f <sub>y</sub>	60 ksi
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover	3.5 in
Footing Bottom Bar	#4
Footing Bottom Bar Cover	3.5 in
Pedestal Bar	#3
Pedestal Bar Cover	1.5 in
Pedestal Ties	#3

#### General Material Properties

	Label	E (ksi)	G (ksi)	Nu	Therm (1E5 F)	Density(k/ft <sup>3</sup> )	f <sub>c</sub> (ksi)
1	gen_Conc3NW	3155	1372	.15	.6	.145	
2	gen_Conc4NW	3644	1584	.15	.6	.145	
3	gen_Conc3LV	2085	906	.15	.6	.11	
4	gen_Conc4LV	2408	1047	.15	.6	.11	
5	gen_Alum	10600	4077	.3	1.29	.173	
6	gen_Steel	29000	11154	.3	.65	.49	
7	RIGID	1e+7		0	0	0	

#### Concrete Properties

	Label	E (ksi)	G (ksi)	Nu	Therm (1E5 F)	Density(k/ft <sup>3</sup> )	f <sub>c</sub> (ksi)
1	Conc3000NW	3156	1372	.15	.6	.145	3
2	Conc3500NW	3409	1482	.15	.6	.145	3.5

#### Concrete Properties (Continued)

	Label	E (ksi)	G (ksi)	Nu	Therm (1E5 F)	Density(k/ft <sup>3</sup> )	f <sub>c</sub> (ksi)
3	Conc4000NW	3644	1584	.15	.6	.145	3
4	Conc3000LV	2085	907	.15	.6	.11	3
5	Conc3500LV	2252	979	.15	.6	.11	3.5
6	Conc4000LV	2408	1047	.15	.6	.11	4

#### General Section Sets

	Label	Shape	Type	Material	A (in <sup>2</sup> )	I <sub>y</sub> (in <sup>4</sup> )	I <sub>zz</sub> (in <sup>4</sup> )	J (in <sup>4</sup> )
1	GEN1A	RE4X4	Beam	gen_Conc3NW	16	21.333	21.333	31.573
2	RIGID		None	RIGID	1e+6	1e+8	1e+8	1e+6

#### Concrete Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A (in <sup>2</sup> )	I <sub>y</sub> (in <sup>4</sup> )	I <sub>zz</sub> (in <sup>4</sup> )	J (in <sup>4</sup> )
1	CONC1A	RECT124X24	Beam	Rectangular	Conc4000NW	Typical	576	27648	27648	40919.04

#### Member Primary Data

	Label	Joint	J.Joint	K.Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N37	N40			CONC1A	Beam	Rectangular	Conc4000	Typical
2	M2	N40	N38			CONC1A	Beam	Rectangular	Conc4000	Typical
3	M3	N38	N1			CONC1A	Beam	Rectangular	Conc4000	Typical
4	M4	N20	N39			CONC1A	Beam	Rectangular	Conc4000	Typical
5	M5	N39	N41			CONC1A	Beam	Rectangular	Conc4000	Typical
6	M6	N44	N47			CONC1A	Beam	Rectangular	Conc4000	Typical
7	M7	N47	N46			CONC1A	Beam	Rectangular	Conc4000	Typical
8	M8	N46	N45			CONC1A	Beam	Rectangular	Conc4000	Typical
9	M9	N45	N42			CONC1A	Beam	Rectangular	Conc4000	Typical
10	M10	N42	N43			CONC1A	Beam	Rectangular	Conc4000	Typical
11	M11	N12	N52			CONC1A	Beam	Rectangular	Conc4000	Typical
12	M12	N52	N51			CONC1A	Beam	Rectangular	Conc4000	Typical
13	M13	N51	N50			CONC1A	Beam	Rectangular	Conc4000	Typical
14	M14	N50	N48			CONC1A	Beam	Rectangular	Conc4000	Typical
15	M15	N48	N49			CONC1A	Beam	Rectangular	Conc4000	Typical
16	M16	N49	N60			CONC1A	Beam	Rectangular	Conc4000	Typical
17	M17	N60	N58			CONC1A	Beam	Rectangular	Conc4000	Typical
18	M18	N58	N21			CONC1A	Beam	Rectangular	Conc4000	Typical
19	M19	N22	N53			CONC1A	Beam	Rectangular	Conc4000	Typical
20	M20	N53	N55			CONC1A	Beam	Rectangular	Conc4000	Typical
21	M21	N54	N59			CONC1A	Beam	Rectangular	Conc4000	Typical
22	M22	N59	N57			CONC1A	Beam	Rectangular	Conc4000	Typical
23	M23	N57	N56			CONC1A	Beam	Rectangular	Conc4000	Typical
24	M24	N61	N64			CONC1A	Beam	Rectangular	Conc4000	Typical
25	M25	N64	N63			CONC1A	Beam	Rectangular	Conc4000	Typical
26	M26	N63	N62			CONC1A	Beam	Rectangular	Conc4000	Typical
27	M27	N37	N44			CONC1A	Beam	Rectangular	Conc4000	Typical
28	M28	N44	N13			CONC1A	Beam	Rectangular	Conc4000	Typical
29	M29	N2	N54			CONC1A	Beam	Rectangular	Conc4000	Typical
30	M30	N54	N61			CONC1A	Beam	Rectangular	Conc4000	Typical
31	M31	N19	N56			CONC1A	Beam	Rectangular	Conc4000	Typical
32	M32	N56	N62			CONC1A	Beam	Rectangular	Conc4000	Typical
33	M33	N41	N43			CONC1A	Beam	Rectangular	Conc4000	Typical
34	M34	N43	N49			CONC1A	Beam	Rectangular	Conc4000	Typical
35	M35	N49	N55			CONC1A	Beam	Rectangular	Conc4000	Typical
36	M36	N4	N45			CONC1A	Beam	Rectangular	Conc4000	Typical
37	M37	N45	N50			CONC1A	Beam	Rectangular	Conc4000	Typical

#### Member Primary Data (Continued)

	Label	J.Joint	J.Joint	K.Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
38	M39	N38	N46			CONC1A	Beam	Rectangular	Conc4000	Typical
39	M40	N46	N51			CONC1A	Beam	Rectangular	Conc4000	Typical
40	M42	N58	N57			CONC1A	Beam	Rectangular	Conc4000	Typical
41	M43	N57	N63			CONC1A	Beam	Rectangular	Conc4000	Typical
42	M44	N40	N47			CONC1A	Beam	Rectangular	Conc4000	Typical
43	M45	N47	N52			CONC1A	Beam	Rectangular	Conc4000	Typical
44	M46	N52	N60			CONC1A	Beam	Rectangular	Conc4000	Typical
45	M47	N60	N59			CONC1A	Beam	Rectangular	Conc4000	Typical
46	M48	N59	N64			CONC1A	Beam	Rectangular	Conc4000	Typical
47	M49	N39	N42			CONC1A	Beam	Rectangular	Conc4000	Typical
48	M50	N42	N48			CONC1A	Beam	Rectangular	Conc4000	Typical
49	M51	N48	N53			CONC1A	Beam	Rectangular	Conc4000	Typical
50	M52	N25	N23			CONC1A	Beam	Rectangular	Conc4000	Typical
51	M55	N4	N6			CONC1A	Beam	Rectangular	Conc4000	Typical
52	M58	N5	N3			CONC1A	Beam	Rectangular	Conc4000	Typical
53	M59	N14	N11			CONC1A	Beam	Rectangular	Conc4000	Typical
54	M65	N9	N7			CONC1A	Beam	Rectangular	Conc4000	Typical
55	M68	N8	N10			CONC1A	Beam	Rectangular	Conc4000	Typical
56	M73	N19	N16			CONC1A	Beam	Rectangular	Conc4000	Typical
57	M74	N16	N22			CONC1A	Beam	Rectangular	Conc4000	Typical
58	M75	N22	N18			CONC1A	Beam	Rectangular	Conc4000	Typical
59	M77	N32	N31			CONC1A	Beam	Rectangular	Conc4000	Typical
60	M78	N36	N35			CONC1A	Beam	Rectangular	Conc4000	Typical
61	M79	N30	N29			CONC1A	Beam	Rectangular	Conc4000	Typical
62	M80	N33	N34			CONC1A	Beam	Rectangular	Conc4000	Typical
63	M81	N27	N28			CONC1A	Beam	Rectangular	Conc4000	Typical
64	M82	N28	N26			CONC1A	Beam	Rectangular	Conc4000	Typical
65	M83	N26	N24			CONC1A	Beam	Rectangular	Conc4000	Typical
66	M89	N138	N141			CONC1A	Beam	Rectangular	Conc4000	Typical
67	M90	N141	N139			CONC1A	Beam	Rectangular	Conc4000	Typical
68	M91	N139	N102			CONC1A	Beam	Rectangular	Conc4000	Typical
69	M92	N121	N140			CONC1A	Beam	Rectangular	Conc4000	Typical
70	M93	N140	N142			CONC1A	Beam	Rectangular	Conc4000	Typical
71	M94	N145	N148			CONC1A	Beam	Rectangular	Conc4000	Typical
72	M95	N148	N147			CONC1A	Beam	Rectangular	Conc4000	Typical
73	M96	N147	N146			CONC1A	Beam	Rectangular	Conc4000	Typical
74	M97	N146	N143			CONC1A	Beam	Rectangular	Conc4000	Typical
75	M98	N143	N144			CONC1A	Beam	Rectangular	Conc4000	Typical
76	M99	N113	N153			CONC1A	Beam	Rectangular	Conc4000	Typical
77	M100	N153	N152			CONC1A	Beam	Rectangular	Conc4000	Typical
78	M101	N152	N151			CONC1A	Beam	Rectangular	Conc4000	Typical
79	M102	N151	N149			CONC1A	Beam	Rectangular	Conc4000	Typical
80	M103	N149	N150			CONC1A	Beam	Rectangular	Conc4000	Typical
81	M104	N109	N161			CONC1A	Beam	Rectangular	Conc4000	Typical
82	M105	N161	N159			CONC1A	Beam	Rectangular	Conc4000	Typical
83	M106	N159	N122			CONC1A	Beam	Rectangular	Conc4000	Typical
84	M107	N123	N154			CONC1A	Beam	Rectangular	Conc4000	Typical
85	M108	N154	N156			CONC1A	Beam	Rectangular	Conc4000	Typical
86	M109	N155	N160			CONC1A	Beam	Rectangular	Conc4000	Typical
87	M110	N160	N158			CONC1A	Beam	Rectangular	Conc4000	Typical
88	M111	N158	N167			CONC1A	Beam	Rectangular	Conc4000	Typical
89	M112	N167	N165			CONC1A	Beam	Rectangular	Conc4000	Typical
90	M113	N165	N164			CONC1A	Beam	Rectangular	Conc4000	Typical
91	M114	N164	N163			CONC1A	Beam	Rectangular	Conc4000	Typical
92	M115	N138	N145			CONC1A	Beam	Rectangular	Conc4000	Typical
93	M116	N145	N114			CONC1A	Beam	Rectangular	Conc4000	Typical
94	M117	N103	N155			CONC1A	Beam	Rectangular	Conc4000	Typical

#### Member Primary Data (Continued)

	Label	J.Joint	J.Joint	K.Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
95	M118	N155	N162			CONC1A	Beam	Rectangular	Conc4000	Typical
96	M119	N120	N157			CONC1A	Beam	Rectangular	Conc4000	Typical
97	M120	N157	N163			CONC1A	Beam	Rectangular	Conc4000	Typical
98	M121	N142	N144			CONC1A	Beam	Rectangular	Conc4000	Typical
99	M122	N144	N150			CONC1A	Beam	Rectangular	Conc4000	Typical
100	M123	N150	N156			CONC1A	Beam	Rectangular	Conc4000	Typical
101	M124	N105	N146			CONC1A	Beam	Rectangular	Conc4000	Typical
102	M125	N146	N151			CONC1A	Beam	Rectangular	Conc4000	Typical
103	M126	N151	N118			CONC1A	Beam	Rectangular	Conc4000	Typical
104	M127	N139	N147			CONC1A	Beam	Rectangular	Conc4000	Typical
105	M128	N147	N152			CONC1A	Beam	Rectangular	Conc4000	Typical
106	M129	N158	N164			CONC1A	Beam	Rectangular	Conc4000	Typical
107	M131	N158	N164			CONC1A	Beam	Rectangular	Conc4000	Typical
108	M132	N141	N148			CONC1A	Beam	Rectangular	Conc4000	Typical
109	M133	N148	N153			CONC1A	Beam	Rectangular	Conc4000	Typical
110	M134	N153	N161			CONC1A	Beam	Rectangular	Conc4000	Typical
111	M135	N161	N160			CONC1A	Beam	Rectangular	Conc4000	Typical
112	M136	N160	N165			CONC1A	Beam	Rectangular	Conc4000	Typical
113	M137	N143	N149			CONC1A	Beam	Rectangular	Conc4000	Typical
114	M138	N143	N149			CONC1A	Beam	Rectangular	Conc4000	Typical
115	M139	N149	N154			CONC1A	Beam	Rectangular	Conc4000	Typical
116	M140	N126	N124			CONC1A	Beam	Rectangular	Conc4000	Typical
117	M143	N105	N107			CONC1A	Beam	Rectangular	Conc4000	Typical
118	M146	N106	N104			CONC1A	Beam	Rectangular	Conc4000	Typical
119	M147	N115	N112			CONC1A	Beam	Rectangular	Conc4000	Typical
120	M148	N110	N108			CONC1A	Beam	Rectangular	Conc4000	Typical
121	M156	N109	N111			CONC1A	Beam	Rectangular	Conc4000	Typical
122	M161	N120	N117			CONC1A	Beam	Rectangular	Conc4000	Typical
123	M162	N117	N123			CONC1A	Beam	Rectangular	Conc4000	Typical
124	M163	N123	N119			CONC1A	Beam	Rectangular	Conc4000	Typical
125	M165	N133	N132			CONC1A	Beam	Rectangular	Conc4000	Typical
126	M166	N137	N136			CONC1A	Beam	Rectangular	Conc4000	Typical
127	M167	N131	N130			CONC1A	Beam	Rectangular	Conc4000	Typical
128	M168	N134	N135			CONC1A	Beam	Rectangular	Conc4000	Typical
129	M169	N128	N129			CONC1A	Beam	Rectangular	Conc4000	Typical
130	M170	N129	N127			CONC1A	Beam	Rectangular	Conc4000	Typical
131	M171	N127	N125			CONC1A	Beam	Rectangular	Conc4000	Typical
132	M177	N239	N242			CONC1A	Beam	Rectangular	Conc4000	Typical
133	M178	N242	N240			CONC1A	Beam	Rectangular	Conc4000	Typical
134	M179	N245	N244			CONC1A	Beam	Rectangular	Conc4000	Typical
135	M180	N222	N241			CONC1A	Beam	Rectangular	Conc4000	Typical
136	M181	N241	N243			CONC1A	Beam	Rectangular	Conc4000	Typical
137	M182	N246	N249			CONC1A	Beam	Rectangular	Conc4000	Typical
138	M183	N249	N248			CONC1A	Beam	Rectangular	Conc4000	Typical
139	M184	N248	N247			CONC1A	Beam	Rectangular	Conc4000	Typical
140	M185	N247	N244			CONC1A	Beam	Rectangular	Conc4000	Typical
141	M186	N245	N246			CONC1A	Beam	Rectangular	Conc4000	Typical
142	M187	N214	N254			CONC1A	Beam	Rectangular	Conc4000	Typical
143	M188	N254	N253			CONC1A	Beam	Rectangular	Conc4000	Typical
144	M189	N253	N252			CONC1A	Beam	Rectangular	Conc4000	Typical
145	M190	N252	N250			CONC1A	Beam	Rectangular	Conc4000	Typical
146	M191	N250	N251			CONC1A	Beam	Rectangular	Conc4000	Typical
147	M192	N210	N260			CONC1A	Beam	Rectangular	Conc4000	Typical
148	M193	N260	N261			CONC1A	Beam	Rectangular	Conc4000	Typical
149	M194	N260	N263			CONC1A	Beam	Rectangular	Conc4000	Typical
150	M195	N224	N255			CONC1A	Beam	Rectangular	Conc4000	Typical
151	M196	N255	N257			CONC1A	Beam	Rectangular	Conc4000	Typical

Member Primary Data (Continued)

Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
152	M197	N256	N261		CONC1A	Beam	Rectangular	Conc4000...	Typical
153	M198	N261	N259		CONC1A	Beam	Rectangular	Conc4000...	Typical
154	M199	N259	N258		CONC1A	Beam	Rectangular	Conc4000...	Typical
155	M200	N263	N266		CONC1A	Beam	Rectangular	Conc4000...	Typical
156	M201	N266	N265		CONC1A	Beam	Rectangular	Conc4000...	Typical
157	M202	N265	N264		CONC1A	Beam	Rectangular	Conc4000...	Typical
158	M203	N239	N246		CONC1A	Beam	Rectangular	Conc4000...	Typical
159	M204	N246	N215		CONC1A	Beam	Rectangular	Conc4000...	Typical
160	M205	N204	N256		CONC1A	Beam	Rectangular	Conc4000...	Typical
161	M206	N256	N263		CONC1A	Beam	Rectangular	Conc4000...	Typical
162	M207	N227	N258		CONC1A	Beam	Rectangular	Conc4000...	Typical
163	M208	N258	N264		CONC1A	Beam	Rectangular	Conc4000...	Typical
164	M209	N243	N245		CONC1A	Beam	Rectangular	Conc4000...	Typical
165	M210	N245	N251		CONC1A	Beam	Rectangular	Conc4000...	Typical
166	M211	N251	N257		CONC1A	Beam	Rectangular	Conc4000...	Typical
167	M212	N206	N247		CONC1A	Beam	Rectangular	Conc4000...	Typical
168	M213	N247	N232		CONC1A	Beam	Rectangular	Conc4000...	Typical
169	M214	N252	N219		CONC1A	Beam	Rectangular	Conc4000...	Typical
170	M215	N240	N248		CONC1A	Beam	Rectangular	Conc4000...	Typical
171	M216	N248	N253		CONC1A	Beam	Rectangular	Conc4000...	Typical
172	M218	N260	N259		CONC1A	Beam	Rectangular	Conc4000...	Typical
173	M219	N259	N265		CONC1A	Beam	Rectangular	Conc4000...	Typical
174	M220	N242	N249		CONC1A	Beam	Rectangular	Conc4000...	Typical
175	M221	N249	N254		CONC1A	Beam	Rectangular	Conc4000...	Typical
176	M222	N254	N262		CONC1A	Beam	Rectangular	Conc4000...	Typical
177	M223	N262	N261		CONC1A	Beam	Rectangular	Conc4000...	Typical
178	M224	N261	N266		CONC1A	Beam	Rectangular	Conc4000...	Typical
179	M225	N241	N244		CONC1A	Beam	Rectangular	Conc4000...	Typical
180	M226	N244	N250		CONC1A	Beam	Rectangular	Conc4000...	Typical
181	M227	N250	N255		CONC1A	Beam	Rectangular	Conc4000...	Typical
182	M228	N227	N225		CONC1A	Beam	Rectangular	Conc4000...	Typical
183	M231	N206	N208		CONC1A	Beam	Rectangular	Conc4000...	Typical
184	M234	N207	N205		CONC1A	Beam	Rectangular	Conc4000...	Typical
185	M235	N216	N213		CONC1A	Beam	Rectangular	Conc4000...	Typical
186	M241	N211	N209		CONC1A	Beam	Rectangular	Conc4000...	Typical
187	M244	N210	N212		CONC1A	Beam	Rectangular	Conc4000...	Typical
188	M249	N221	N218		CONC1A	Beam	Rectangular	Conc4000...	Typical
189	M250	N218	N224		CONC1A	Beam	Rectangular	Conc4000...	Typical
190	M251	N224	N220		CONC1A	Beam	Rectangular	Conc4000...	Typical
191	M253	N234	N233		CONC1A	Beam	Rectangular	Conc4000...	Typical
192	M254	N238	N237		CONC1A	Beam	Rectangular	Conc4000...	Typical
193	M255	N232	N231		CONC1A	Beam	Rectangular	Conc4000...	Typical
194	M256	N235	N236		CONC1A	Beam	Rectangular	Conc4000...	Typical
195	M257	N229	N230		CONC1A	Beam	Rectangular	Conc4000...	Typical
196	M258	N230	N228		CONC1A	Beam	Rectangular	Conc4000...	Typical
197	M259	N228	N226		CONC1A	Beam	Rectangular	Conc4000...	Typical
198	M265	N247A	N248A		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
199	M267	N249A	N248A		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
200	M268	N249B	N249B		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
201	M270	N250B	N249B		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
202	M271	N253A	N254A		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
203	M273	N255A	N254A		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
204	M271A	N67	N66		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
205	M271B	N168	N167		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
206	M272	N269	N268		W10X17	Beam	Wide Flange	A36 Gr.36	Typical
207	M271C	N69	N58		CONC1A	Beam	Rectangular	Conc4000...	Typical
208	M273A	N200	N159		CONC1A	Beam	Rectangular	Conc4000...	Typical

Member Primary Data (Continued)

Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
209	M275	N301	N260		CONC1A	Beam	Rectangular	Conc4000...	Typical
210	M210A	N50	N17		CONC1A	Beam	Rectangular	Conc4000...	Typical
211	M211A	N72	N81		RIGID	None	None	RIGID	Typical
212	M212A	N73	N82		RIGID	None	None	RIGID	Typical
213	M213A	N97	N77		RIGID	None	None	RIGID	Typical
214	M214A	N77	N78		RIGID	None	None	RIGID	Typical
215	M215A	N101	N100A		RIGID	None	None	RIGID	Typical
216	M216A	N74	N75		RIGID	None	None	RIGID	Typical
217	M217	N75	N79		RIGID	None	None	RIGID	Typical
218	M218A	N79	N76		RIGID	None	None	RIGID	Typical
219	M219A	N70	N91		RIGID	None	None	RIGID	Typical
220	M220A	N71	N92		RIGID	None	None	RIGID	Typical

Member Advanced Data

Label	I Release	J Release	I Offset(in)	J Offset(in)	T/C Only	Physical	TOM	Inactive
1	M1					Yes		
2	M2					Yes		
3	M3		BenPIN			Yes		
4	M4	BenPIN				Yes		
5	M5					Yes		
6	M6					Yes		
7	M7					Yes		
8	M8					Yes		
9	M9					Yes		
10	M10					Yes		
11	M11	BenPIN				Yes		
12	M12		BenPIN			Yes		
13	M13	BenPIN				Yes		
14	M14					Yes		
15	M15					Yes		
16	M16	BenPIN				Yes		
17	M17					Yes		
18	M18		BenPIN			Yes		
19	M19	BenPIN				Yes		
20	M20					Yes		
21	M21					Yes		
22	M22					Yes		
23	M23					Yes		
24	M24					Yes		
25	M25					Yes		
26	M26					Yes		
27	M27					Yes		
28	M28		BenPIN			Yes		
29	M29	BenPIN				Yes		
30	M30					Yes		
31	M31	BenPIN				Yes		
32	M32					Yes		
33	M33					Yes		
34	M34					Yes		
35	M35					Yes		
36	M36	BenPIN				Yes		
37	M37					Yes		
38	M39					Yes		
39	M40		BenPIN			Yes		
40	M42					Yes		
41	M43					Yes		

Member Advanced Data (Continued)

Label	I Release	J Release	I Offset(in)	J Offset(in)	T/C Only	Physical	TOM	Inactive
42	M44					Yes		
43	M45					Yes		
44	M46					Yes		
45	M47					Yes		
46	M48					Yes		
47	M49					Yes		
48	M50					Yes		
49	M51					Yes		
50	M52	BenPIN	BenPIN			Yes		
51	M55	BenPIN	BenPIN			Yes		
52	M58	BenPIN	BenPIN			Yes		
53	M59	BenPIN	BenPIN			Yes		
54	M65	BenPIN	BenPIN			Yes		
55	M68	BenPIN	BenPIN			Yes		
56	M73	BenPIN	BenPIN			Yes		
57	M74	BenPIN	BenPIN			Yes		
58	M75	BenPIN	BenPIN			Yes		
59	M77	BenPIN	BenPIN			Yes		
60	M78	BenPIN	BenPIN			Yes		
61	M79	BenPIN	BenPIN			Yes		
62	M80	BenPIN	BenPIN			Yes		
63	M81					Yes		
64	M82					Yes		
65	M83					Yes		
66	M89					Yes		
67	M90					Yes		
68	M91		BenPIN			Yes		
69	M92	BenPIN				Yes		
70	M93					Yes		
71	M94					Yes		
72	M95					Yes		
73	M96					Yes		
74	M97					Yes		
75	M98					Yes		
76	M99	BenPIN				Yes		
77	M100		BenPIN			Yes		
78	M101	BenPIN				Yes		
79	M102					Yes		
80	M103					Yes		
81	M104	BenPIN				Yes		
82	M105					Yes		
83	M106		BenPIN			Yes		
84	M107	BenPIN				Yes		
85	M108					Yes		
86	M109					Yes		
87	M110					Yes		
88	M111					Yes		
89	M112					Yes		
90	M113					Yes		
91	M114					Yes		
92	M115		BenPIN			Yes		
93	M116					Yes		
94	M117	BenPIN				Yes		
95	M118					Yes		
96	M119	BenPIN				Yes		
97	M120					Yes		
98	M121					Yes		

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset(in)	J Offset(in)	T/C Only	Physical	TOM	Inactive
99	M122						Yes		
100	M123						Yes		
101	M124	BenPIN					Yes		
102	M125						Yes		
103	M126						Yes		
104	M127		BenPIN				Yes		
105	M128		BenPIN				Yes		
106	M130						Yes		
107	M131						Yes		
108	M132						Yes		
109	M133						Yes		
110	M134						Yes		
111	M135						Yes		
112	M136						Yes		
113	M137						Yes		
114	M138						Yes		
115	M139						Yes		
116	M140	BenPIN	BenPIN				Yes		
117	M143	BenPIN	BenPIN				Yes		
118	M146	BenPIN	BenPIN				Yes		
119	M147	BenPIN	BenPIN				Yes		
120	M153	BenPIN	BenPIN				Yes		
121	M156	BenPIN	BenPIN				Yes		
122	M161	BenPIN	BenPIN				Yes		
123	M162	BenPIN	BenPIN				Yes		
124	M163	BenPIN	BenPIN				Yes		
125	M165	BenPIN	BenPIN				Yes		
126	M166	BenPIN	BenPIN				Yes		
127	M167	BenPIN	BenPIN				Yes		
128	M168	BenPIN	BenPIN				Yes		
129	M169						Yes		
130	M170						Yes		
131	M171						Yes		
132	M177						Yes		
133	M178						Yes		
134	M179		BenPIN				Yes		
135	M180	BenPIN					Yes		
136	M181						Yes		
137	M182						Yes		
138	M183						Yes		
139	M184						Yes		
140	M185						Yes		
141	M186						Yes		
142	M187	BenPIN					Yes		
143	M188		BenPIN				Yes		
144	M189	BenPIN					Yes		
145	M190						Yes		
146	M191						Yes		
147	M192	BenPIN					Yes		
148	M193						Yes		
149	M194		BenPIN				Yes		
150	M195	BenPIN					Yes		
151	M196						Yes		
152	M197						Yes		
153	M198						Yes		
154	M199						Yes		
155	M200						Yes		

Member Advanced Data (Continued)

Label	I Release	J Release	I Offset(in)	J Offset(in)	T/C Only	Physical	TOM	Inactive
156	M201					Yes		
157	M202					Yes		
158	M203					Yes		
159	M204	BenPIN	BenPIN			Yes		
160	M205	BenPIN				Yes		
161	M206					Yes		
162	M207	BenPIN				Yes		
163	M208					Yes		
164	M209					Yes		
165	M210					Yes		
166	M211					Yes		
167	M212	BenPIN				Yes		
168	M213					Yes		
169	M214		BenPIN			Yes		
170	M215					Yes		
171	M216		BenPIN			Yes		
172	M218					Yes		
173	M219					Yes		
174	M220					Yes		
175	M221					Yes		
176	M222					Yes		
177	M223					Yes		
178	M224					Yes		
179	M225					Yes		
180	M226					Yes		
181	M227					Yes		
182	M228	BenPIN	BenPIN			Yes		
183	M231	BenPIN	BenPIN			Yes		
184	M234	BenPIN	BenPIN			Yes		
185	M235	BenPIN	BenPIN			Yes		
186	M241	BenPIN	BenPIN			Yes		
187	M244	BenPIN	BenPIN			Yes		
188	M249	BenPIN	BenPIN			Yes		
189	M250	BenPIN	BenPIN			Yes		
190	M251	BenPIN	BenPIN			Yes		
191	M253	BenPIN	BenPIN			Yes		
192	M254	BenPIN	BenPIN			Yes		
193	M255	BenPIN	BenPIN			Yes		
194	M256	BenPIN	BenPIN			Yes		
195	M257					Yes		
196	M258					Yes		
197	M259					Yes		
198	M265	BenPIN	BenPIN			Yes		
199	M267	BenPIN	BenPIN			Yes		
200	M268	BenPIN	BenPIN			Yes		
201	M270	BenPIN	BenPIN			Yes		
202	M271	BenPIN	BenPIN			Yes		
203	M273	BenPIN	BenPIN			Yes		
204	M271A					Yes		
205	M271B					Yes		
206	M272					Yes		
207	M271C	BenPIN	BenPIN			Yes		
208	M273A	BenPIN	BenPIN			Yes		
209	M275	BenPIN	BenPIN			Yes		
210	M210A	BenPIN	BenPIN			Yes		
211	M211A	BenPIN	BenPIN			Yes		
212	M212A	BenPIN	BenPIN			Yes		

Member Advanced Data (Continued)

Label	I Release	J Release	I Offset(in)	J Offset(in)	T/C Only	Physical	TOM	Inactive
213	M213A	BenPIN	BenPIN			Yes		
214	M214A	BenPIN	BenPIN			Yes		
215	M215A	BenPIN	BenPIN			Yes		
216	M216A	BenPIN	BenPIN			Yes		
217	M217	BenPIN	BenPIN			Yes		
218	M218A	BenPIN	BenPIN			Yes		
219	M219A	BenPIN	BenPIN			Yes		
220	M220A	BenPIN	BenPIN			Yes		

Joint Boundary Conditions

Joint Label	X (k/in)	Y (k/in)	Z (k/in)	X Rot (k-ft/rad)	Y Rot (k-ft/rad)	Z Rot (k-ft/rad)	Footings
1	N76	Reaction	Reaction	Reaction			
2	N74	Reaction	Reaction	Reaction			
3	N75		Reaction	Reaction			
4	N72	Reaction	Reaction	Reaction			
5	N73	Reaction	Reaction	Reaction			
6	N71	Reaction	Reaction	Reaction			
7	N92	Reaction	Reaction	Reaction			
8	N70	Reaction	Reaction	Reaction			
9	N91	Reaction	Reaction	Reaction			
10	N78		Reaction	Reaction			
11	N77	Reaction	Reaction	Reaction			
12	N97	Reaction	Reaction	Reaction			
13	N81		Reaction	Reaction			
14	N82		Reaction	Reaction			
15	N79		Reaction	Reaction			
16	N100A	Reaction	Reaction	Reaction			
17	N101	Reaction	Reaction	Reaction			
18	N80		Reaction	Reaction			
19	N37	Storv 1	Storv 1				
20	N41						
21	N142						
22	N243						
23	N239						
24	N138						
25	N55						
26	N156						
27	N257						
28	N62						
29	N163						
30	N264						
31	N263						
32	N162						
33	N61						
34	N265A	Reaction		Reaction			
35	N98	Reaction		Reaction			
36	N282	Reaction		Reaction			
37	N287	Reaction		Reaction			
38	N320	Reaction		Reaction			
39	N325	Reaction		Reaction			
40	N330	Reaction		Reaction			
41	N335	Reaction		Reaction			
42	N340	Reaction		Reaction			
43	N345	Reaction		Reaction			
44	N350	Reaction		Reaction			
45	N355	Reaction		Reaction			

Joint Boundary Conditions (Continued)

Joint Label	X (k/in)	Y (k/in)	Z (k/in)	X Rot (k-ft/rad)	Y Rot (k-ft/rad)	Z Rot (k-ft/rad)	Footings
46	N360	Reaction		Reaction			
47	N365	Reaction		Reaction			
48	N370	Reaction		Reaction			
49	N538	Reaction		Reaction			
50	N543	Reaction		Reaction			
51	N90A	Reaction		Reaction			
52	N551	Reaction		Reaction			
53	N556	Reaction		Reaction			
54	N94	Reaction		Reaction			
55	N486	Reaction		Reaction			
56	N481	Reaction		Reaction			
57	N491	Reaction		Reaction			
58	N618		Reaction	Reaction			
59	N613		Reaction	Reaction			
60	N608		Reaction	Reaction			
61	N100		Reaction	Reaction			
62	N682		Reaction	Reaction			
63	N677		Reaction	Reaction			
64	N672		Reaction	Reaction			
65	N667		Reaction	Reaction			
66	N662		Reaction	Reaction			
67	N730	Reaction		Reaction			
68	N735	Reaction		Reaction			
69	N740	Reaction		Reaction			
70	N745	Reaction		Reaction			
71	N93	Reaction		Reaction			
72	N95	Reaction		Reaction			
73	N806	Reaction		Reaction			
74	N811	Reaction		Reaction			
75	N816	Reaction		Reaction			
76	N862			Reaction			
77	N857			Reaction			
78	N90			Reaction			
79	N878			Reaction			
80	N873			Reaction			
81	N83			Reaction			
82	N891			Reaction			
83	N886			Reaction			
84	N1063			Reaction			
85	N1068			Reaction			
86	N89			Reaction			
87	N86			Reaction			
88	N386			Reaction			
89	N991			Reaction			
90	N996			Reaction			
91	N1001			Reaction			
92	N1006			Reaction			
93	N1095			Reaction			
94	N1100			Reaction			
95	N1105			Reaction			
96	N85			Reaction			
97	N1152			Reaction			
98	N1157			Reaction			
99	N1162			Reaction			
100	N88			Reaction			
101	N1200			Reaction			
102	N1205			Reaction			

Joint Boundary Conditions (Continued)

Joint Label	X (k/in)	Y (k/in)	Z (k/in)	X Rot (k-ft/rad)	Y Rot (k-ft/rad)	Z Rot (k-ft/rad)	Footings
103	N1210		Reaction	Reaction			
104	N1304		Reaction	Reaction			
105	N1309		Reaction	Reaction			
106	N1314		Reaction	Reaction			
107	N1319		Reaction	Reaction			
108	N87		Reaction	Reaction			
109	N1251		Reaction	Reaction			
110	N1256		Reaction	Reaction			

Plates

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
1	P73	N17	N251A	N255B	N254B	gen Conc3LW	8		
2	P74	N251A	N252A	N256A	N255B	gen Conc3LW	8		Yes
3	P75	N252A	N253B	N257A	N256A	gen Conc3LW	8		Yes
4	P76	N253B	N118	N258A	N257A	gen Conc3LW	8		Yes
5	P77	N254B	N255B	N259A	N21	gen Conc3LW	8		Yes
6	P78	N255B	N256A	N260A	N259A	gen Conc3LW	8		Yes
7	P79	N256A	N257A	N261A	N260A	gen Conc3LW	8		Yes
8	P80	N257A	N258A	N122	N261A	gen Conc3LW	8		Yes
9	P80A	N77	N262A	N266A	N265A	gen Conc3LW	8		Yes
10	P81	N262A	N263A	N267A	N266A	gen Conc3LW	8		Yes
11	P82	N263A	N264A	N268A	N267A	gen Conc3LW	8		Yes
12	P83	N17	N254B	N268A	N267A	gen Conc3LW	8		Yes
13	P84	N265A	N266A	N269A	N98	gen Conc3LW	8		Yes
14	P85	N266A	N267A	N270A	N269A	gen Conc3LW	8		Yes
15	P86	N267A	N268A	N271A	N270A	gen Conc3LW	8		Yes
16	P87	N268A	N254B	N21	N271A	gen Conc3LW	8		Yes
17	P87A	N118	N272	N275	N258A	gen Conc3LW	8		Yes
18	P88	N272	N273	N276	N275	gen Conc3LW	8		Yes
19	P89	N273	N274	N277	N276	gen Conc3LW	8		Yes
20	P90	N274	N219	N278	N277	gen Conc3LW	8		Yes
21	P91	N258A	N275	N279	N122	gen Conc3LW	8		Yes
22	P92	N275	N276	N280	N279	gen Conc3LW	8		Yes
23	P93	N276	N277	N281	N280	gen Conc3LW	8		Yes
24	P94	N277	N278	N282	N281	gen Conc3LW	8		Yes
25	P94A	N98	N269A	N283	N282	gen Conc3LW	8		Yes
26	P95	N269A	N270A	N284	N283	gen Conc3LW	8		Yes
27	P96	N270A	N271A	N285	N284	gen Conc3LW	8		Yes
28	P97	N271A	N21	N286	N285	gen Conc3LW	8		Yes
29	P98	N282	N283	N288	N287	gen Conc3LW	8		Yes
30	P99	N283	N284	N289	N288	gen Conc3LW	8		Yes
31	P100	N284	N285	N290	N289	gen Conc3LW	8		Yes
32	P101	N285	N286	N291	N290	gen Conc3LW	8		Yes
33	P102	N287	N288	N292	N97	gen Conc3LW	8		Yes
34	P103	N288	N289	N293	N292	gen Conc3LW	8		Yes
35	P104	N289	N290	N294	N293	gen Conc3LW	8		Yes
36	P105	N290	N291	N19	N294	gen Conc3LW	8		Yes
37	P105A	N21	N259A	N295	N296	gen Conc3LW	8		Yes
38	P106	N259A	N260A	N296	N295	gen Conc3LW	8		Yes
39	P107	N260A	N261A	N297	N296	gen Conc3LW	8		Yes
40	P108	N261A	N122	N298	N297	gen Conc3LW	8		Yes
41	P109	N286	N295	N299	N298	gen Conc3LW	8		Yes
42	P110	N295	N296	N300	N299	gen Conc3LW	8		Yes
43	P111	N296	N297	N301A	N300	gen Conc3LW	8		Yes
44	P112	N297	N298	N302	N301A	gen Conc3LW	8		Yes
45	P113	N291	N299	N303	N19	gen Conc3LW	8		Yes



Plates (Continued)

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
46 P114	N299	N300	N304	N303	gen. Conc3LW	8		Yes
47 P115	N300	N301A	N305	N304	gen. Conc3LW	8		Yes
48 P116	N302	N303	N305	N305	gen. Conc3LW	8		Yes
49 P116A	N122	N279	N306	N298	gen. Conc3LW	8		Yes
50 P117	N279	N280	N307	N306	gen. Conc3LW	8		Yes
51 P118	N280	N281	N308	N307	gen. Conc3LW	8		Yes
52 P119	N281	N223	N309	N308	gen. Conc3LW	8		Yes
53 P120	N298	N306	N310	N302	gen. Conc3LW	8		Yes
54 P121	N306	N307	N311	N310	gen. Conc3LW	8		Yes
55 P122	N307	N308	N312	N311	gen. Conc3LW	8		Yes
56 P123	N308	N309	N313	N312	gen. Conc3LW	8		Yes
57 P124	N302	N310	N314	N120	gen. Conc3LW	8		Yes
58 P125	N310	N311	N315	N314	gen. Conc3LW	8		Yes
59 P126	N311	N312	N316	N315	gen. Conc3LW	8		Yes
60 P127	N312	N313	N221	N316	gen. Conc3LW	8		Yes
61 P127A	N100A	N317	N321	N320	gen. Conc3LW	12		Yes
62 P128	N317	N318	N322	N321	gen. Conc3LW	12		Yes
63 P129	N318	N319	N322	N322	gen. Conc3LW	12		Yes
64 P130	N319	N51	N324	N323	gen. Conc3LW	12		Yes
65 P131	N320	N321	N326	N325	gen. Conc3LW	12		Yes
66 P132	N321	N322	N327	N326	gen. Conc3LW	12		Yes
67 P133	N322	N323	N328	N327	gen. Conc3LW	12		Yes
68 P134	N323	N324	N329	N328	gen. Conc3LW	12		Yes
69 P135	N325	N326	N331	N330	gen. Conc3LW	12		Yes
70 P136	N326	N327	N332	N331	gen. Conc3LW	12		Yes
71 P137	N327	N328	N333	N332	gen. Conc3LW	12		Yes
72 P138	N328	N329	N334	N333	gen. Conc3LW	12		Yes
73 P139	N330	N331	N336	N335	gen. Conc3LW	12		Yes
74 P140	N331	N332	N337	N336	gen. Conc3LW	12		Yes
75 P141	N332	N333	N338	N337	gen. Conc3LW	12		Yes
76 P142	N333	N334	N339	N338	gen. Conc3LW	12		Yes
77 P143	N335	N336	N341	N340	gen. Conc3LW	12		Yes
78 P144	N336	N337	N342	N341	gen. Conc3LW	12		Yes
79 P145	N337	N338	N343	N342	gen. Conc3LW	12		Yes
80 P146	N338	N339	N344	N343	gen. Conc3LW	12		Yes
81 P147	N340	N341	N346	N345	gen. Conc3LW	12		Yes
82 P148	N341	N342	N347	N346	gen. Conc3LW	12		Yes
83 P149	N342	N343	N348	N347	gen. Conc3LW	12		Yes
84 P150	N343	N344	N349	N348	gen. Conc3LW	12		Yes
85 P151	N345	N346	N351	N350	gen. Conc3LW	12		Yes
86 P152	N346	N347	N352	N351	gen. Conc3LW	12		Yes
87 P153	N347	N348	N353	N352	gen. Conc3LW	12		Yes
88 P154	N348	N349	N354	N353	gen. Conc3LW	12		Yes
89 P155	N350	N351	N356	N355	gen. Conc3LW	12		Yes
90 P156	N351	N352	N357	N356	gen. Conc3LW	12		Yes
91 P157	N352	N353	N358	N357	gen. Conc3LW	12		Yes
92 P158	N353	N354	N359	N358	gen. Conc3LW	12		Yes
93 P159	N355	N356	N361	N360	gen. Conc3LW	12		Yes
94 P160	N356	N357	N362	N361	gen. Conc3LW	12		Yes
95 P161	N357	N358	N363	N362	gen. Conc3LW	12		Yes
96 P162	N358	N359	N364	N363	gen. Conc3LW	12		Yes
97 P163	N360	N361	N366	N365	gen. Conc3LW	12		Yes
98 P164	N361	N362	N367	N366	gen. Conc3LW	12		Yes
99 P165	N362	N363	N368	N367	gen. Conc3LW	12		Yes
100 P166	N363	N364	N369	N368	gen. Conc3LW	12		Yes
101 P167	N365	N366	N371	N370	gen. Conc3LW	12		Yes
102 P168	N366	N367	N372	N371	gen. Conc3LW	12		Yes

Plates (Continued)

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
103 P169	N367	N368	N373	N372	gen. Conc3LW	12		Yes
104 P170	N368	N369	N374	N373	gen. Conc3LW	12		Yes
105 P171	N369	N370	N375	N374	gen. Conc3LW	12		Yes
106 P172	N371	N372	N376	N375	gen. Conc3LW	12		Yes
107 P173	N372	N373	N377	N376	gen. Conc3LW	12		Yes
108 P174	N373	N374	N378	N377	gen. Conc3LW	12		Yes
109 P174A	N51	N378	N381	N324	gen. Conc3LW	12		Yes
110 P175	N378	N379	N382	N381	gen. Conc3LW	12		Yes
111 P176	N379	N380	N383	N382	gen. Conc3LW	12		Yes
112 P177	N380	N381	N384	N383	gen. Conc3LW	12		Yes
113 P178	N382	N381	N385	N384	gen. Conc3LW	12		Yes
114 P179	N381	N382	N386	N385	gen. Conc3LW	12		Yes
115 P180	N382	N383	N387	N386	gen. Conc3LW	12		Yes
116 P181	N383	N384	N388	N387	gen. Conc3LW	12		Yes
117 P182	N329	N385	N389	N334	gen. Conc3LW	12		Yes
118 P183	N385	N386	N390	N389	gen. Conc3LW	12		Yes
119 P184	N386	N387	N391	N390	gen. Conc3LW	12		Yes
120 P185	N387	N388	N392	N391	gen. Conc3LW	12		Yes
121 P186	N334	N389	N393	N339	gen. Conc3LW	12		Yes
122 P187	N389	N390	N394	N393	gen. Conc3LW	12		Yes
123 P188	N390	N391	N395	N394	gen. Conc3LW	12		Yes
124 P189	N391	N392	N396	N395	gen. Conc3LW	12		Yes
125 P190	N339	N393	N397	N344	gen. Conc3LW	12		Yes
126 P191	N393	N394	N398	N397	gen. Conc3LW	12		Yes
127 P192	N394	N395	N399	N398	gen. Conc3LW	12		Yes
128 P193	N395	N396	N400	N399	gen. Conc3LW	12		Yes
129 P194	N344	N397	N401	N349	gen. Conc3LW	12		Yes
130 P195	N397	N398	N402	N401	gen. Conc3LW	12		Yes
131 P196	N398	N399	N403	N402	gen. Conc3LW	12		Yes
132 P197	N399	N400	N404	N403	gen. Conc3LW	12		Yes
133 P198	N349	N401	N405	N354	gen. Conc3LW	12		Yes
134 P199	N401	N402	N406	N405	gen. Conc3LW	12		Yes
135 P200	N402	N403	N407	N406	gen. Conc3LW	12		Yes
136 P201	N403	N404	N408	N407	gen. Conc3LW	12		Yes
137 P202	N354	N405	N409	N359	gen. Conc3LW	12		Yes
138 P203	N405	N406	N410	N409	gen. Conc3LW	12		Yes
139 P204	N406	N407	N411	N410	gen. Conc3LW	12		Yes
140 P205	N407	N408	N412	N411	gen. Conc3LW	12		Yes
141 P206	N359	N409	N413	N364	gen. Conc3LW	12		Yes
142 P207	N409	N410	N414	N363	gen. Conc3LW	12		Yes
143 P208	N410	N411	N415	N414	gen. Conc3LW	12		Yes
144 P209	N411	N412	N416	N415	gen. Conc3LW	12		Yes
145 P210	N364	N413	N417	N369	gen. Conc3LW	12		Yes
146 P211	N413	N414	N418	N417	gen. Conc3LW	12		Yes
147 P212	N414	N415	N419	N418	gen. Conc3LW	12		Yes
148 P213	N415	N416	N420	N419	gen. Conc3LW	12		Yes
149 P214	N369	N417	N421	N374	gen. Conc3LW	12		Yes
150 P215	N417	N418	N422	N421	gen. Conc3LW	12		Yes
151 P216	N418	N419	N423	N422	gen. Conc3LW	12		Yes
152 P217	N419	N420	N424	N423	gen. Conc3LW	12		Yes
153 P218	N374	N421	N425	N99	gen. Conc3LW	12		Yes
154 P219	N421	N422	N426	N425	gen. Conc3LW	12		Yes
155 P220	N422	N423	N427	N426	gen. Conc3LW	12		Yes
156 P221	N423	N424	N200	N427	gen. Conc3LW	12		Yes
157 P221A	N152	N428	N431	N384	gen. Conc3LW	12		Yes
158 P222	N428	N429	N432	N431	gen. Conc3LW	12		Yes
159 P223	N429	N430	N433	N432	gen. Conc3LW	12		Yes

Plates (Continued)

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
160	P224	N430	N253	N434	N433	gen. Conc3LW	12		Yes
161	P225	N384	N431	N435	N388	gen. Conc3LW	12		Yes
162	P226	N431	N432	N436	N435	gen. Conc3LW	12		Yes
163	P227	N432	N433	N437	N436	gen. Conc3LW	12		Yes
164	P228	N433	N434	N438	N437	gen. Conc3LW	12		Yes
165	P229	N388	N435	N439	N392	gen. Conc3LW	12		Yes
166	P230	N435	N436	N440	N439	gen. Conc3LW	12		Yes
167	P231	N436	N437	N441	N440	gen. Conc3LW	12		Yes
168	P232	N437	N438	N442	N441	gen. Conc3LW	12		Yes
169	P233	N392	N439	N443	N396	gen. Conc3LW	12		Yes
170	P234	N439	N440	N444	N443	gen. Conc3LW	12		Yes
171	P235	N440	N441	N445	N444	gen. Conc3LW	12		Yes
172	P236	N441	N442	N446	N445	gen. Conc3LW	12		Yes
173	P237	N396	N443	N447	N400	gen. Conc3LW	12		Yes
174	P238	N443	N444	N448	N447	gen. Conc3LW	12		Yes
175	P239	N444	N445	N449	N448	gen. Conc3LW	12		Yes
176	P240	N445	N446	N450	N449	gen. Conc3LW	12		Yes
177	P241	N400	N447	N451	N404	gen. Conc3LW	12		Yes
178	P242	N447	N448	N452	N451	gen. Conc3LW	12		Yes
179	P243	N448	N449	N453	N452	gen. Conc3LW	12		Yes
180	P244	N449	N450	N454	N453	gen. Conc3LW	12		Yes
181	P245	N404	N451	N455	N408	gen. Conc3LW	12		Yes
182	P246	N451	N452	N456	N455	gen. Conc3LW	12		Yes
183	P247	N452	N453	N457	N456	gen. Conc3LW	12		Yes
184	P248	N453	N454	N458	N457	gen. Conc3LW	12		Yes
185	P249	N408	N455	N459	N412	gen. Conc3LW	12		Yes
186	P250	N455	N456	N460	N459	gen. Conc3LW	12		Yes
187	P251	N456	N457	N461	N460	gen. Conc3LW	12		Yes
188	P252	N457	N458	N462	N461	gen. Conc3LW	12		Yes
189	P253	N412	N459	N463	N416	gen. Conc3LW	12		Yes
190	P254	N459	N460	N464	N463	gen. Conc3LW	12		Yes
191	P255	N460	N461	N465	N464	gen. Conc3LW	12		Yes
192	P256	N461	N462	N466	N465	gen. Conc3LW	12		Yes
193	P257	N416	N463	N467	N420	gen. Conc3LW	12		Yes
194	P258	N463	N464	N468	N467	gen. Conc3LW	12		Yes
195	P259	N464	N465	N469	N468	gen. Conc3LW	12		Yes
196	P260	N465	N466	N470	N469	gen. Conc3LW	12		Yes
197	P261	N420	N467	N471	N424	gen. Conc3LW	12		Yes
198	P262	N467	N468	N472	N466	gen. Conc3LW	12		Yes
199	P263	N468	N469	N473	N472	gen. Conc3LW	12		Yes
200	P264	N469	N470	N474	N473	gen. Conc3LW	12		Yes
201	P265	N424	N471	N475	N200	gen. Conc3LW	12		Yes
202	P266	N471	N472	N476	N475	gen. Conc3LW	12		Yes
203	P267	N472	N473	N477	N476	gen. Conc3LW	12		Yes
204	P268	N473	N474	N301	N477	gen. Conc3LW	12		Yes
205	P269	N474	N475	N482	N481	gen. Conc3LW	8		Yes
206	P270	N475	N476	N483	N482	gen. Conc3LW	8		Yes
207	P271	N476	N479	N484	N483	gen. Conc3LW	8		Yes
208	P272	N480	N29	N485	N484	gen. Conc3LW	8		Yes
209	P273	N481	N482	N487	N486	gen. Conc3LW	8		Yes
210	P274	N482	N483	N488	N487	gen. Conc3LW	8		Yes
211	P275	N483	N484	N489	N488	gen. Conc3LW	8		Yes
212	P276	N484	N485	N490	N489	gen. Conc3LW	8		Yes
213	P277	N485	N486	N491	N490	gen. Conc3LW	8		Yes
214	P278	N486	N488	N493	N492	gen. Conc3LW	8		Yes
215	P279	N488	N489	N494	N493	gen. Conc3LW	8		Yes
216	P280	N489	N490	N495	N494	gen. Conc3LW	8		Yes

Plates (Continued)

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
274 P333	N557	N558	N479	N478	gen Conc3LW	8		Yes
275 P334	N558	N559	N480	N479	gen Conc3LW	8		Yes
276 P335	N559	N560	N481	N480	gen Conc3LW	8		Yes
277 P335A	N3	N561	N564	N542	gen Conc3LW	8		Yes
278 P336	N561	N562	N565	N564	gen Conc3LW	8		Yes
279 P337	N562	N563	N566	N565	gen Conc3LW	8		Yes
280 P338	N563	N104	N567	N566	gen Conc3LW	8		Yes
281 P339	N542	N564	N568	N547	gen Conc3LW	8		Yes
282 P340	N564	N565	N569	N568	gen Conc3LW	8		Yes
283 P341	N565	N566	N570	N569	gen Conc3LW	8		Yes
284 P342	N566	N567	N571	N570	gen Conc3LW	8		Yes
285 P343	N547	N568	N572	N1	gen Conc3LW	8		Yes
286 P344	N568	N569	N573	N572	gen Conc3LW	8		Yes
287 P345	N569	N570	N574	N573	gen Conc3LW	8		Yes
288 P346	N570	N571	N102	N574	gen Conc3LW	8		Yes
289 P346A	N1	N572	N575	N555	gen Conc3LW	8		Yes
290 P347	N572	N573	N576	N575	gen Conc3LW	8		Yes
291 P348	N573	N574	N577	N576	gen Conc3LW	8		Yes
292 P349	N574	N102	N578	N577	gen Conc3LW	8		Yes
293 P350	N555	N575	N579	N560	gen Conc3LW	8		Yes
294 P351	N575	N576	N580	N579	gen Conc3LW	8		Yes
295 P352	N576	N577	N581	N580	gen Conc3LW	8		Yes
296 P353	N577	N578	N582	N581	gen Conc3LW	8		Yes
297 P354	N560	N579	N499	N29	gen Conc3LW	8		Yes
298 P355	N579	N580	N500	N499	gen Conc3LW	8		Yes
299 P356	N580	N581	N501	N500	gen Conc3LW	8		Yes
300 P357	N581	N582	N130	N501	gen Conc3LW	8		Yes
301 P357A	N102	N583	N586	N578	gen Conc3LW	8		Yes
302 P358	N583	N584	N587	N586	gen Conc3LW	8		Yes
303 P359	N584	N585	N588	N587	gen Conc3LW	8		Yes
304 P360	N585	N203	N589	N588	gen Conc3LW	8		Yes
305 P361	N578	N586	N590	N589	gen Conc3LW	8		Yes
306 P362	N586	N587	N591	N590	gen Conc3LW	8		Yes
307 P363	N587	N588	N592	N591	gen Conc3LW	8		Yes
308 P364	N588	N589	N593	N592	gen Conc3LW	8		Yes
309 P365	N582	N590	N517	N130	gen Conc3LW	8		Yes
310 P366	N590	N591	N518	N517	gen Conc3LW	8		Yes
311 P367	N591	N592	N519	N518	gen Conc3LW	8		Yes
312 P368	N592	N593	N231	N519	gen Conc3LW	8		Yes
313 P368A	N104	N594	N597	N567	gen Conc3LW	8		Yes
314 P369	N601	N595	N598	N597	gen Conc3LW	8		Yes
315 P370	N595	N596	N599	N598	gen Conc3LW	8		Yes
316 P371	N596	N205	N600	N599	gen Conc3LW	8		Yes
317 P372	N567	N597	N601	N571	gen Conc3LW	8		Yes
318 P373	N597	N598	N602	N601	gen Conc3LW	8		Yes
319 P374	N598	N599	N603	N602	gen Conc3LW	8		Yes
320 P375	N599	N600	N604	N603	gen Conc3LW	8		Yes
321 P376	N601	N604	N583	N102	gen Conc3LW	8		Yes
322 P377	N601	N602	N584	N583	gen Conc3LW	8		Yes
323 P378	N602	N603	N585	N584	gen Conc3LW	8		Yes
324 P379	N603	N604	N203	N585	gen Conc3LW	8		Yes
325 P379A	N100	N605	N609	N608	gen Conc3LW	8		Yes
326 P380	N605	N606	N610	N609	gen Conc3LW	8		Yes
327 P381	N606	N607	N611	N610	gen Conc3LW	8		Yes
328 P382	N607	N33	N612	N611	gen Conc3LW	8		Yes
329 P383	N608	N609	N614	N613	gen Conc3LW	8		Yes
330 P384	N609	N610	N615	N614	gen Conc3LW	8		Yes

Plates (Continued)

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
331 P385	N610	N611	N616	N615	gen Conc3LW	8		Yes
332 P386	N611	N612	N617	N616	gen Conc3LW	8		Yes
333 P387	N612	N613	N618	N617	gen Conc3LW	8		Yes
334 P388	N614	N615	N620	N619	gen Conc3LW	8		Yes
335 P389	N615	N616	N621	N620	gen Conc3LW	8		Yes
336 P390	N616	N617	N622	N621	gen Conc3LW	8		Yes
337 P391	N618	N619	N623	N78	gen Conc3LW	8		Yes
338 P392	N619	N620	N624	N623	gen Conc3LW	8		Yes
339 P393	N620	N621	N625	N624	gen Conc3LW	8		Yes
340 P394	N621	N622	N626	N625	gen Conc3LW	8		Yes
341 P394A	N33	N626	N628	N612	gen Conc3LW	8		Yes
342 P395	N626	N627	N630	N629	gen Conc3LW	8		Yes
343 P396	N627	N628	N631	N630	gen Conc3LW	8		Yes
344 P397	N628	N134	N632	N631	gen Conc3LW	8		Yes
345 P398	N612	N629	N633	N617	gen Conc3LW	8		Yes
346 P399	N628	N630	N634	N633	gen Conc3LW	8		Yes
347 P400	N630	N631	N635	N634	gen Conc3LW	8		Yes
348 P401	N631	N632	N636	N635	gen Conc3LW	8		Yes
349 P402	N617	N633	N637	N622	gen Conc3LW	8		Yes
350 P403	N633	N634	N638	N637	gen Conc3LW	8		Yes
351 P404	N634	N635	N639	N638	gen Conc3LW	8		Yes
352 P405	N635	N636	N640	N639	gen Conc3LW	8		Yes
353 P406	N622	N637	N641	N18	gen Conc3LW	8		Yes
354 P407	N637	N638	N642	N641	gen Conc3LW	8		Yes
355 P408	N638	N639	N643	N642	gen Conc3LW	8		Yes
356 P409	N639	N640	N119	N643	gen Conc3LW	8		Yes
357 P409A	N134	N644	N647	N632	gen Conc3LW	8		Yes
358 P410	N644	N645	N648	N647	gen Conc3LW	8		Yes
359 P411	N645	N646	N649	N648	gen Conc3LW	8		Yes
360 P412	N646	N235	N650	N649	gen Conc3LW	8		Yes
361 P413	N632	N647	N651	N636	gen Conc3LW	8		Yes
362 P414	N647	N648	N652	N651	gen Conc3LW	8		Yes
363 P415	N648	N649	N653	N652	gen Conc3LW	8		Yes
364 P416	N649	N650	N654	N653	gen Conc3LW	8		Yes
365 P417	N636	N651	N655	N640	gen Conc3LW	8		Yes
366 P418	N651	N652	N656	N655	gen Conc3LW	8		Yes
367 P419	N652	N653	N657	N656	gen Conc3LW	8		Yes
368 P420	N653	N654	N658	N657	gen Conc3LW	8		Yes
369 P421	N640	N655	N659	N119	gen Conc3LW	8		Yes
370 P422	N655	N656	N660	N659	gen Conc3LW	8		Yes
371 P423	N656	N657	N661	N660	gen Conc3LW	8		Yes
372 P424	N657	N658	N220	N661	gen Conc3LW	8		Yes
373 P424A	N77	N262A	N663	N662	gen Conc3LW	8		Yes
374 P425	N262A	N263A	N664	N663	gen Conc3LW	8		Yes
375 P426	N263A	N264A	N665	N664	gen Conc3LW	8		Yes
376 P427	N264A	N17	N666	N665	gen Conc3LW	8		Yes
377 P428	N662	N663	N668	N667	gen Conc3LW	8		Yes
378 P429	N663	N664	N669	N668	gen Conc3LW	8		Yes
379 P430	N664	N665	N670	N669	gen Conc3LW	8		Yes
380 P431	N665	N666	N671	N670	gen Conc3LW	8		Yes
381 P432	N667	N668	N673	N672	gen Conc3LW	8		Yes
382 P433	N668	N669	N674	N673	gen Conc3LW	8		Yes
383 P434	N669	N670	N675	N674	gen Conc3LW	8		Yes
384 P435	N670	N671	N676	N675	gen Conc3LW	8		Yes
385 P436	N672	N673	N678	N677	gen Conc3LW	8		Yes
386 P437	N673	N674	N679	N678	gen Conc3LW	8		Yes
387 P438	N674	N675	N680	N679	gen Conc3LW	8		Yes

Plates (Continued)

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
388 P439	N675	N676	N681	N680	gen Conc3LW	8		Yes
389 P440	N677	N678	N683	N682	gen Conc3LW	8		Yes
390 P441	N678	N679	N684	N683	gen Conc3LW	8		Yes
391 P442	N679	N680	N685	N684	gen Conc3LW	8		Yes
392 P443	N680	N681	N686	N685	gen Conc3LW	8		Yes
393 P444	N683	N685	N100	N686	gen Conc3LW	8		Yes
394 P445	N683	N684	N606	N605	gen Conc3LW	8		Yes
395 P446	N684	N685	N607	N606	gen Conc3LW	8		Yes
396 P447	N685	N686	N33	N607	gen Conc3LW	8		Yes
397 P447A	N17	N251A	N687	N686	gen Conc3LW	8		Yes
398 P448	N251A	N252A	N688	N687	gen Conc3LW	8		Yes
399 P449	N252A	N253B	N689	N688	gen Conc3LW	8		Yes
400 P450	N253B	N118	N690	N689	gen Conc3LW	8		Yes
401 P451	N686	N687	N691	N690	gen Conc3LW	8		Yes
402 P452	N687	N688	N692	N691	gen Conc3LW	8		Yes
403 P453	N688	N689	N693	N692	gen Conc3LW	8		Yes
404 P454	N689	N690	N694	N693	gen Conc3LW	8		Yes
405 P455	N671	N691	N695	N676	gen Conc3LW	8		Yes
406 P456	N691	N692	N696	N695	gen Conc3LW	8		Yes
407 P457	N692	N693	N697	N696	gen Conc3LW	8		Yes
408 P458	N693	N694	N698	N697	gen Conc3LW	8		Yes
409 P459	N676	N695	N699	N681	gen Conc3LW	8		Yes
410 P460	N695	N696	N700	N699	gen Conc3LW	8		Yes
411 P461	N696	N697	N701	N700	gen Conc3LW	8		Yes
412 P462	N697	N698	N702	N701	gen Conc3LW	8		Yes
413 P463	N681	N699	N703	N696	gen Conc3LW	8		Yes
414 P464	N699	N700	N704	N703	gen Conc3LW	8		Yes
415 P465	N700	N701	N705	N704	gen Conc3LW	8		Yes
416 P466	N692	N704	N706	N705	gen Conc3LW	8		Yes
417 P467	N686	N703	N626	N33	gen Conc3LW	8		Yes
418 P468	N703	N704	N627	N626	gen Conc3LW	8		Yes
419 P469	N704	N705	N628	N627	gen Conc3LW	8		Yes
420 P470	N705	N706	N134	N628	gen Conc3LW	8		Yes
421 P470A	N118	N272	N707	N690	gen Conc3LW	8		Yes
422 P471	N272	N273	N708	N707	gen Conc3LW	8		Yes
423 P472	N273	N274	N709	N708	gen Conc3LW	8		Yes
424 P473	N274	N219	N710	N709	gen Conc3LW	8		Yes
425 P474	N690	N707	N711	N694	gen Conc3LW	8		Yes
426 P475	N707	N708	N712	N711	gen Conc3LW	8		Yes
427 P476	N708	N709	N713	N712	gen Conc3LW	8		Yes



**Plates (Continued)**

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
502 P548	N790	N791	N795	N794	gen. Conc3LW	8		Yes
503 P549	N791	N792	N796	N795	gen. Conc3LW	8		Yes
504 P550	N792	N793	N796	N796	gen. Conc3LW	8		Yes
505 P550A	N83	N750	N797	N95	gen. Conc3LW	8		Yes
506 P551	N750	N751	N798	N797	gen. Conc3LW	8		Yes
507 P552	N751	N752	N799	N798	gen. Conc3LW	8		Yes
508 P553	N752	N20	N799	N799	gen. Conc3LW	8		Yes
509 P553A	N20	N772	N800	N30	gen. Conc3LW	8		Yes
510 P554	N772	N773	N801	N800	gen. Conc3LW	8		Yes
511 P555	N773	N774	N802	N801	gen. Conc3LW	8		Yes
512 P556	N774	N121	N131	N802	gen. Conc3LW	8		Yes
513 P556A	N121	N794	N803	N131	gen. Conc3LW	8		Yes
514 P557	N794	N795	N804	N803	gen. Conc3LW	8		Yes
515 P558	N795	N796	N805	N804	gen. Conc3LW	8		Yes
516 P559	N796	N222	N232	N805	gen. Conc3LW	8		Yes
517 P559A	N95	N797	N807	N806	gen. Conc3LW	8		Yes
518 P560	N797	N798	N808	N807	gen. Conc3LW	8		Yes
519 P561	N798	N799	N809	N808	gen. Conc3LW	8		Yes
520 P562	N799	N30	N810	N809	gen. Conc3LW	8		Yes
521 P563	N806	N807	N812	N811	gen. Conc3LW	8		Yes
522 P564	N807	N808	N813	N812	gen. Conc3LW	8		Yes
523 P565	N808	N809	N814	N813	gen. Conc3LW	8		Yes
524 P566	N809	N810	N815	N814	gen. Conc3LW	8		Yes
525 P567	N811	N812	N817	N816	gen. Conc3LW	8		Yes
526 P568	N812	N813	N818	N817	gen. Conc3LW	8		Yes
527 P569	N813	N814	N819	N818	gen. Conc3LW	8		Yes
528 P570	N814	N815	N820	N819	gen. Conc3LW	8		Yes
529 P571	N816	N817	N821	N92	gen. Conc3LW	8		Yes
530 P572	N817	N818	N822	N821	gen. Conc3LW	8		Yes
531 P573	N818	N819	N823	N822	gen. Conc3LW	8		Yes
532 P574	N819	N820	N6	N823	gen. Conc3LW	8		Yes
533 P574A	N30	N800	N824	N810	gen. Conc3LW	8		Yes
534 P575	N801	N802	N825	N824	gen. Conc3LW	8		Yes
535 P576	N801	N802	N826	N825	gen. Conc3LW	8		Yes
536 P577	N802	N131	N827	N826	gen. Conc3LW	8		Yes
537 P578	N810	N824	N828	N815	gen. Conc3LW	8		Yes
538 P579	N824	N825	N829	N828	gen. Conc3LW	8		Yes
539 P580	N825	N826	N830	N829	gen. Conc3LW	8		Yes
540 P581	N826	N827	N831	N830	gen. Conc3LW	8		Yes
541 P582	N815	N828	N832	N820	gen. Conc3LW	8		Yes
542 P583	N803	N804	N833	N832	gen. Conc3LW	8		Yes
543 P584	N829	N830	N834	N833	gen. Conc3LW	8		Yes
544 P585	N830	N831	N835	N834	gen. Conc3LW	8		Yes
545 P586	N820	N832	N836	N6	gen. Conc3LW	8		Yes
546 P587	N832	N833	N837	N836	gen. Conc3LW	8		Yes
547 P588	N833	N834	N838	N837	gen. Conc3LW	8		Yes
548 P589	N834	N835	N107	N838	gen. Conc3LW	8		Yes
549 P589A	N131	N803	N839	N827	gen. Conc3LW	8		Yes
550 P590	N803	N804	N840	N839	gen. Conc3LW	8		Yes
551 P591	N804	N805	N841	N840	gen. Conc3LW	8		Yes
552 P592	N805	N232	N842	N841	gen. Conc3LW	8		Yes
553 P593	N827	N839	N843	N831	gen. Conc3LW	8		Yes
554 P594	N839	N840	N844	N843	gen. Conc3LW	8		Yes
555 P595	N840	N841	N845	N844	gen. Conc3LW	8		Yes
556 P596	N841	N842	N846	N845	gen. Conc3LW	8		Yes
557 P597	N831	N843	N847	N835	gen. Conc3LW	8		Yes
558 P598	N843	N844	N848	N847	gen. Conc3LW	8		Yes

**Plates (Continued)**

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
559 P599	N844	N845	N849	N848	gen. Conc3LW	8		Yes
560 P600	N845	N846	N850	N849	gen. Conc3LW	8		Yes
561 P601	N846	N847	N851	N107	gen. Conc3LW	8		Yes
562 P602	N847	N848	N852	N851	gen. Conc3LW	8		Yes
563 P603	N848	N849	N853	N852	gen. Conc3LW	8		Yes
564 P604	N849	N850	N208	N853	gen. Conc3LW	8		Yes
565 P604A	N90	N854	N858	N857	gen. Conc3LW	8		Yes
566 P605	N854	N855	N859	N858	gen. Conc3LW	8		Yes
567 P606	N855	N856	N860	N859	gen. Conc3LW	8		Yes
568 P607	N856	N857	N861	N860	gen. Conc3LW	8		Yes
569 P608	N857	N858	N863	N862	gen. Conc3LW	8		Yes
570 P609	N858	N859	N864	N863	gen. Conc3LW	8		Yes
571 P610	N859	N860	N865	N864	gen. Conc3LW	8		Yes
572 P611	N860	N861	N866	N865	gen. Conc3LW	8		Yes
573 P612	N862	N863	N867	N79	gen. Conc3LW	8		Yes
574 P613	N863	N864	N868	N867	gen. Conc3LW	8		Yes
575 P614	N864	N865	N869	N868	gen. Conc3LW	8		Yes
576 P615	N865	N866	N115	N869	gen. Conc3LW	8		Yes
577 P615A	N83	N870	N874	N873	gen. Conc3LW	8		Yes
578 P616	N870	N871	N875	N874	gen. Conc3LW	8		Yes
579 P617	N871	N872	N876	N875	gen. Conc3LW	8		Yes
580 P618	N872	N13	N877	N876	gen. Conc3LW	8		Yes
581 P619	N873	N874	N879	N878	gen. Conc3LW	8		Yes
582 P620	N874	N875	N880	N879	gen. Conc3LW	8		Yes
583 P621	N875	N876	N881	N880	gen. Conc3LW	8		Yes
584 P622	N876	N877	N882	N881	gen. Conc3LW	8		Yes
585 P623	N878	N879	N884	N90	gen. Conc3LW	8		Yes
586 P624	N879	N880	N885	N884	gen. Conc3LW	8		Yes
587 P625	N880	N881	N886	N885	gen. Conc3LW	8		Yes
588 P626	N881	N882	N36	N886	gen. Conc3LW	8		Yes
589 P626A	N76	N883	N887	N886	gen. Conc3LW	8		Yes
590 P627	N883	N884	N888	N887	gen. Conc3LW	8		Yes
591 P628	N884	N885	N889	N888	gen. Conc3LW	8		Yes
592 P629	N885	N114	N890	N889	gen. Conc3LW	8		Yes
593 P630	N886	N887	N892	N891	gen. Conc3LW	8		Yes
594 P631	N887	N888	N893	N892	gen. Conc3LW	8		Yes
595 P632	N888	N889	N894	N893	gen. Conc3LW	8		Yes
596 P633	N889	N890	N895	N894	gen. Conc3LW	8		Yes
597 P634	N891	N892	N870	N83	gen. Conc3LW	8		Yes
598 P635	N892	N893	N871	N870	gen. Conc3LW	8		Yes
599 P636	N893	N894	N872	N871	gen. Conc3LW	8		Yes
600 P637	N894	N895	N13	N872	gen. Conc3LW	8		Yes
601 P637A	N14	N896	N899	N890	gen. Conc3LW	8		Yes
602 P638	N896	N897	N900	N899	gen. Conc3LW	8		Yes
603 P639	N897	N898	N901	N900	gen. Conc3LW	8		Yes
604 P640	N898	N115	N902	N901	gen. Conc3LW	8		Yes
605 P641	N899	N899	N903	N895	gen. Conc3LW	8		Yes
606 P642	N899	N900	N904	N903	gen. Conc3LW	8		Yes
607 P643	N900	N901	N905	N904	gen. Conc3LW	8		Yes
608 P644	N901	N902	N906	N905	gen. Conc3LW	8		Yes
609 P645	N895	N903	N907	N13	gen. Conc3LW	8		Yes
610 P646	N903	N904	N908	N907	gen. Conc3LW	8		Yes
611 P647	N904	N905	N909	N908	gen. Conc3LW	8		Yes
612 P648	N905	N906	N114	N909	gen. Conc3LW	8		Yes
613 P648A	N13	N907	N910	N877	gen. Conc3LW	8		Yes
614 P649	N907	N908	N911	N910	gen. Conc3LW	8		Yes
615 P650	N908	N909	N912	N911	gen. Conc3LW	8		Yes

**Plates (Continued)**

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
616	P651	N909	N114	N913	N912	gen. Conc3LW	8		Yes
617	P652	N877	N910	N914	N882	gen. Conc3LW	8		Yes
618	P653	N910	N911	N915	N914	gen. Conc3LW	8		Yes
619	P654	N911	N912	N916	N915	gen. Conc3LW	8		Yes
620	P655	N912	N913	N917	N916	gen. Conc3LW	8		Yes
621	P656	N882	N914	N918	N916	gen. Conc3LW	8		Yes
622	P657	N914	N915	N919	N918	gen. Conc3LW	8		Yes
623	P658	N915	N916	N920	N919	gen. Conc3LW	8		Yes
624	P659	N916	N917	N137	N920	gen. Conc3LW	8		Yes
625	P659A	N36	N918	N921	N861	gen. Conc3LW	8		Yes
626	P660	N918	N919	N922	N921	gen. Conc3LW	8		Yes
627	P661	N919	N920	N923	N922	gen. Conc3LW	8		Yes
628	P662	N920	N137	N924	N923	gen. Conc3LW	8		Yes
629	P663	N861	N921	N925	N866	gen. Conc3LW	8		Yes
630	P664	N921	N922	N926	N925	gen. Conc3LW	8		Yes
631	P665	N922	N923	N927	N926	gen. Conc3LW	8		Yes
632	P666	N923	N924	N928	N927	gen. Conc3LW	8		Yes
633	P667	N866	N925	N929	N15	gen. Conc3LW	8		Yes
634	P668	N925	N926	N930	N929	gen. Conc3LW	8		Yes
635	P669	N926	N927	N931	N930	gen. Conc3LW	8		Yes
636	P670	N927	N928	N116	N931	gen. Conc3LW	8		Yes
637	P670A	N137	N932	N935	N924	gen. Conc3LW	8		Yes
638	P671	N932	N933	N936	N935	gen. Conc3LW	8		Yes
639	P672	N933	N934	N937	N936	gen. Conc3LW	8		Yes
640	P673	N934	N238	N938	N937	gen. Conc3LW	8		Yes
641	P674	N924	N935	N939	N928	gen. Conc3LW	8		Yes
642	P675	N935	N936	N940	N939	gen. Conc3LW	8		Yes
643	P676	N936	N937	N941	N940	gen. Conc3LW	8		Yes
644	P677	N937	N938	N942	N941	gen. Conc3LW	8		Yes
645	P678	N938	N939	N943	N116	gen. Conc3LW	8		Yes
646	P679	N939	N940	N944	N943	gen. Conc3LW	8		Yes
647	P680	N940	N941	N945	N944	gen. Conc3LW	8		Yes
648	P681	N941	N942	N217	N945	gen. Conc3LW	8		Yes
649	P681A	N114	N946	N949	N913	gen. Conc3LW	8		Yes
650	P682	N946	N947	N950	N949	gen. Conc3LW	8		Yes
651	P683	N947	N948	N951	N950	gen. Conc3LW	8		Yes
652	P684	N948	N215	N952	N951	gen. Conc3LW	8		Yes
653	P685	N913	N949	N953	N917	gen. Conc3LW	8		Yes
654	P686	N949	N950	N954	N953	gen. Conc3LW	8		Yes
655	P687	N950	N951	N955	N954	gen. Conc3LW	8		Yes
656	P688	N951	N952	N956	N955	gen. Conc3LW	8		Yes
657	P689	N917	N953	N932	N137	gen. Conc3LW	8		Yes
658	P690	N953	N954	N933	N932	gen. Conc3LW	8		Yes
659	P691	N954	N955	N934	N933	gen. Conc3LW	8		Yes
660	P692	N955	N956	N238	N934	gen. Conc3LW	8		Yes
661	P692A	N115	N957	N960	N927	gen. Conc3LW	8		Yes
662	P693	N957	N958	N961	N960	gen. Conc3LW	8		Yes
663	P694	N958	N959	N962	N961	gen. Conc3LW	8		Yes
664	P695	N959	N216	N963	N962	gen. Conc3LW	8		Yes
665	P696	N902	N960	N964	N906	gen. Conc3LW	8		Yes
666	P697	N960	N961	N965	N964	gen. Conc3LW	8		Yes
667	P698	N961	N962	N966	N965	gen. Conc3LW	8		Yes
668	P699	N962	N963	N967	N966	gen. Conc3LW	8		Yes
669	P700	N963	N964	N114	N114	gen. Conc3LW	8		Yes
670	P701	N964	N965	N947	N946	gen. Conc3LW	8		Yes
671	P702	N965	N966	N948	N947	gen. Conc3LW	8		Yes
672	P703	N966	N967	N215	N948	gen. Conc3LW	8		Yes

Plates (Continued)

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
730 P756	N1030	N1031	N1035	N1034	gen Conc3LW	8		Yes
731 P757	N1031	N1032	N1036	N1035	gen Conc3LW	8		Yes
732 P759	N1032	N1033	N1112	N1036	gen Conc3LW	8		Yes
733 P758A	N1036	N883	N1037	N1017	gen Conc3LW	8		Yes
734 P759	N883	N884	N1038	N1037	gen Conc3LW	8		Yes
735 P760	N884	N885	N1039	N1038	gen Conc3LW	8		Yes
736 P761	N885	N227	N1040	N1039	gen Conc3LW	8		Yes
737 P762	N1017	N1037	N1041	N1021	gen Conc3LW	8		Yes
738 P763	N1037	N1038	N1042	N1041	gen Conc3LW	8		Yes
739 P764	N1038	N1039	N1043	N1042	gen Conc3LW	8		Yes
740 P765	N1039	N1040	N1044	N1043	gen Conc3LW	8		Yes
741 P766	N1021	N1041	N1045	N1025	gen Conc3LW	8		Yes
742 P767	N1041	N1042	N1046	N1045	gen Conc3LW	8		Yes
743 P768	N1042	N1043	N1047	N1046	gen Conc3LW	8		Yes
744 P769	N1043	N1044	N1048	N1047	gen Conc3LW	8		Yes
745 P770	N1025	N1045	N1049	N1029	gen Conc3LW	8		Yes
746 P771	N1045	N1046	N1050	N1049	gen Conc3LW	8		Yes
747 P772	N1046	N1047	N1051	N1050	gen Conc3LW	8		Yes
748 P773	N1047	N1048	N1052	N1051	gen Conc3LW	8		Yes
749 P774	N1029	N1049	N1053	N1033	gen Conc3LW	8		Yes
750 P775	N1049	N1050	N1054	N1053	gen Conc3LW	8		Yes
751 P776	N1050	N1051	N1055	N1054	gen Conc3LW	8		Yes
752 P777	N1051	N1052	N1056	N1055	gen Conc3LW	8		Yes
753 P778	N1033	N1053	N1057	N112	gen Conc3LW	8		Yes
754 P779	N1053	N1054	N1058	N1057	gen Conc3LW	8		Yes
755 P780	N1054	N1055	N1059	N1058	gen Conc3LW	8		Yes
756 P781	N1055	N1056	N213	N1059	gen Conc3LW	8		Yes
757 P781A	N75	N1060	N1064	N1063	gen Conc3LW	8		Yes
758 P782	N1060	N1061	N1065	N1064	gen Conc3LW	8		Yes
759 P783	N1061	N1062	N1066	N1065	gen Conc3LW	8		Yes
760 P784	N1062	N12	N1067	N1066	gen Conc3LW	8		Yes
761 P785	N1063	N1064	N1069	N1068	gen Conc3LW	8		Yes
762 P786	N1064	N1065	N1070	N1069	gen Conc3LW	8		Yes
763 P787	N1065	N1066	N1071	N1070	gen Conc3LW	8		Yes
764 P788	N1066	N1067	N1072	N1071	gen Conc3LW	8		Yes
765 P789	N1068	N1069	N968	N89	gen Conc3LW	8		Yes
766 P790	N1069	N1070	N969	N968	gen Conc3LW	8		Yes
767 P791	N1070	N1071	N970	N969	gen Conc3LW	8		Yes
768 P792	N1071	N1072	N35	N970	gen Conc3LW	8		Yes
769 P792A	N113	N1073	N1077	N1076	gen Conc3LW	8		Yes
770 P793	N1074	N1075	N1078	N1077	gen Conc3LW	8		Yes
771 P794	N1075	N1076	N1079	N1078	gen Conc3LW	8		Yes
772 P795	N1076	N214	N1080	N1079	gen Conc3LW	8		Yes
773 P796	N1077	N1078	N1081	N1080	gen Conc3LW	8		Yes
774 P797	N1078	N1079	N1082	N1081	gen Conc3LW	8		Yes
775 P798	N1079	N1080	N1083	N1082	gen Conc3LW	8		Yes
776 P799	N1080	N1081	N1084	N1083	gen Conc3LW	8		Yes
777 P800	N1081	N1082	N980	N1084	gen Conc3LW	8		Yes
778 P801	N1082	N1083	N981	N980	gen Conc3LW	8		Yes
779 P802	N1083	N1084	N982	N981	gen Conc3LW	8		Yes
780 P803	N1084	N1085	N237	N982	gen Conc3LW	8		Yes
781 P803A	N12	N1086	N1089	N1067	gen Conc3LW	8		Yes
782 P804	N1086	N1087	N1090	N1089	gen Conc3LW	8		Yes
783 P805	N1087	N1088	N1091	N1090	gen Conc3LW	8		Yes
784 P806	N1088	N113	N1076	N1091	gen Conc3LW	8		Yes
785 P807	N1067	N1089	N1092	N1072	gen Conc3LW	8		Yes
786 P808	N1089	N1090	N1093	N1092	gen Conc3LW	8		Yes

Plates (Continued)

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
787 P809	N1090	N1091	N1094	N1093	gen Conc3LW	8		Yes
788 P810	N1091	N1076	N1081	N1094	gen Conc3LW	8		Yes
789 P811	N1072	N1092	N1093	N1094	gen Conc3LW	8		Yes
790 P812	N1092	N1093	N875	N974	gen Conc3LW	8		Yes
791 P813	N1093	N1094	N976	N975	gen Conc3LW	8		Yes
792 P814	N1094	N1081	N136	N976	gen Conc3LW	8		Yes
793 P817	N79	N867	N1096	N1095	gen Conc3LW	8		Yes
794 P818	N867	N868	N1097	N1096	gen Conc3LW	8		Yes
795 P819	N868	N869	N1098	N1097	gen Conc3LW	8		Yes
796 P820	N869	N15	N1099	N1098	gen Conc3LW	8		Yes
797 P821	N1095	N1096	N1101	N1100	gen Conc3LW	8		Yes
798 P822	N1096	N1097	N1102	N1101	gen Conc3LW	8		Yes
799 P823	N1097	N1098	N1103	N1102	gen Conc3LW	8		Yes
800 P824	N1098	N1099	N1104	N1103	gen Conc3LW	8		Yes
801 P825	N1100	N1101	N1106	N1105	gen Conc3LW	8		Yes
802 P826	N1101	N1102	N1107	N1106	gen Conc3LW	8		Yes
803 P827	N1102	N1103	N1108	N1107	gen Conc3LW	8		Yes
804 P828	N1103	N1104	N1109	N1108	gen Conc3LW	8		Yes
805 P829	N1105	N1106	N1060	N75	gen Conc3LW	8		Yes
806 P830	N1106	N1107	N1061	N1060	gen Conc3LW	8		Yes
807 P831	N1107	N1108	N1062	N1061	gen Conc3LW	8		Yes
808 P832	N1108	N1109	N12	N1062	gen Conc3LW	8		Yes
809 P832A	N15	N929	N1110	N1099	gen Conc3LW	8		Yes
810 P833	N929	N930	N1111	N1110	gen Conc3LW	8		Yes
811 P834	N930	N931	N1112	N1111	gen Conc3LW	8		Yes
812 P835	N931	N1116	N1113	N1112	gen Conc3LW	8		Yes
813 P836	N1099	N1110	N1114	N1104	gen Conc3LW	8		Yes
814 P837	N1110	N1111	N1115	N1114	gen Conc3LW	8		Yes
815 P838	N1111	N1112	N1116	N1115	gen Conc3LW	8		Yes
816 P839	N1112	N1113	N1117	N1116	gen Conc3LW	8		Yes
817 P840	N1104	N1114	N1118	N1109	gen Conc3LW	8		Yes
818 P841	N1114	N1115	N1119	N1118	gen Conc3LW	8		Yes
819 P842	N1115	N1116	N1120	N1119	gen Conc3LW	8		Yes
820 P843	N1116	N1117	N1121	N1120	gen Conc3LW	8		Yes
821 P844	N1109	N1118	N1086	N12	gen Conc3LW	8		Yes
822 P845	N1118	N1119	N1087	N1086	gen Conc3LW	8		Yes
823 P846	N1119	N1120	N1088	N1087	gen Conc3LW	8		Yes
824 P847	N1120	N1121	N113	N1088	gen Conc3LW	8		Yes
825 P847A	N116	N943	N1122	N1113	gen Conc3LW	8		Yes
826 P848	N943	N944	N1123	N1122	gen Conc3LW	8		Yes
827 P849	N944	N945	N1124	N1123	gen Conc3LW	8		Yes
828 P850	N945	N217	N1125	N1124	gen Conc3LW	8		Yes
829 P851	N1113	N1122	N1126	N1117	gen Conc3LW	8		Yes
830 P852	N1122	N1123	N1127	N1126	gen Conc3LW	8		Yes
831 P853	N1123	N1124	N1128	N1127	gen Conc3LW	8		Yes
832 P854	N1124	N1125	N1129	N1128	gen Conc3LW	8		Yes
833 P855	N1117	N1126	N1130	N1121	gen Conc3LW	8		Yes
834 P856	N1126	N1127	N1131	N1130	gen Conc3LW	8		Yes
835 P857	N1127	N1128	N1132	N1131	gen Conc3LW	8		Yes
836 P858	N1128	N1129	N1133	N1132	gen Conc3LW	8		Yes
837 P859	N1121	N1130	N1073	N113	gen Conc3LW	8		Yes
838 P860	N1130	N1131	N1074	N1073	gen Conc3LW	8		Yes
839 P861	N1131	N1132	N1075	N1074	gen Conc3LW	8		Yes
840 P862	N1132	N1133	N214	N1075	gen Conc3LW	8		Yes
841 P862A	N82	N1134	N1137	N85	gen Conc3LW	8		Yes
842 P863	N1134	N1135	N1138	N1137	gen Conc3LW	8		Yes
843 P864	N1135	N1136	N1139	N1138	gen Conc3LW	8		Yes

Plates (Continued)

	Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
844	P865	N1136	N110	N23	N1139	gen Conc3LW	8		Yes
845	P865A	N10	N1140	N1143	N23	gen Conc3LW	8		Yes
846	P866	N1140	N1141	N1144	N1143	gen Conc3LW	8		Yes
847	P867	N1141	N1142	N1145	N1144	gen Conc3LW	8		Yes
848	P868	N1142	N1117	N1124	N1145	gen Conc3LW	8		Yes
849	P868A	N1143	N1146	N1149	N1146	gen Conc3LW	8		Yes
850	P869	N1146	N1147	N1150	N1149	gen Conc3LW	8		Yes
851	P870	N1147	N1148	N1151	N1150	gen Conc3LW	8		Yes
852	P871	N1148	N212	N225	N1151	gen Conc3LW	8		Yes
853	P871A	N85	N1137	N1153	N1152	gen Conc3LW	8		Yes
854	P872	N1137	N1138	N1154	N1153	gen Conc3LW	8		Yes
855	P873	N1138	N1139	N1155	N1154	gen Conc3LW	8		Yes
856	P874	N1139	N23	N1156	N1155	gen Conc3LW	8		Yes
857	P875	N1152	N1153	N1158	N1157	gen Conc3LW	8		Yes
858	P876	N1153	N1154	N1159	N1158	gen Conc3LW	8		Yes
859	P877	N1154	N1155	N1160	N1159	gen Conc3LW	8		Yes
860	P878	N1155	N1156	N1161	N1160	gen Conc3LW	8		Yes
861	P879	N1157	N1158	N1163	N1162	gen Conc3LW	8		Yes
862	P880	N1158	N1159	N1164	N1163	gen Conc3LW	8		Yes
863	P881	N1159	N1160	N1165	N1164	gen Conc3LW	8		Yes
864	P882	N1160	N1161	N1166	N1165	gen Conc3LW	8		Yes
865	P883	N1162	N1163	N1167	N88	gen Conc3LW	8		Yes
866	P884	N1163	N1164	N1168	N1167	gen Conc3LW	8		Yes
867	P885	N1164	N1165	N1169	N1168	gen Conc3LW	8		Yes
868	P886	N1165	N1166	N32	N1169	gen Conc3LW	8		Yes
869	P886A	N23	N1143	N1170	N1170	gen Conc3LW	8		Yes
870	P887	N1143	N1144	N1171	N1170	gen Conc3LW	8		Yes
871	P888	N1144	N1145	N1172	N1171	gen Conc3LW	8		Yes
872	P889	N1145	N124	N1173	N1172	gen Conc3LW	8		Yes
873	P890	N1156	N1170	N1174	N1161	gen Conc3LW	8		Yes
874	P891	N1170	N1171	N1175	N1174	gen Conc3LW	8		Yes
875	P892	N1171	N1172	N1176	N1175	gen Conc3LW	8		Yes
876	P893	N1172	N1173	N1177	N1176	gen Conc3LW	8		Yes
877	P894	N1161	N1174	N1178	N1166	gen Conc3LW	8		Yes
878	P895	N1174	N1175	N1179	N1178	gen Conc3LW	8		Yes
879	P896	N1175	N1176	N1180	N1179	gen Conc3LW	8		Yes
880	P897	N1176	N1177	N1181	N1180	gen Conc3LW	8		Yes
881	P898	N1166	N1178	N1182	N32	gen Conc3LW	8		Yes
882	P899	N1178	N1179	N1183	N1182	gen Conc3LW	8		Yes
883	P900	N1180	N1180	N1184	N1183	gen Conc3LW	8		Yes
884	P901	N1180	N1181	N1183	N1182	gen Conc3LW	8		Yes
885	P901A	N124	N1149	N1185	N1173	gen Conc3LW	8		Yes
886	P902	N1149	N1150	N1186	N1185	gen Conc3LW	8		Yes
887	P903	N1150	N1151	N1187	N1186	gen Conc3LW	8		Yes
888	P904	N1151	N225	N1188	N1187	gen Conc3LW	8		Yes
889	P905	N1173	N1185	N1189	N1177	gen Conc3LW	8		Yes
890	P906	N1185	N1186	N1190	N1189	gen Conc3LW	8		Yes
891	P907	N1186	N1187	N1191	N1190	gen Conc3LW	8		Yes
892	P908	N1187	N1188	N1192	N1191	gen Conc3LW	8		Yes
893	P909	N1177	N1189	N1193	N1181	gen Conc3LW	8		Yes
894	P910	N1189	N1190	N1194	N1193	gen Conc3LW	8		Yes
895	P911	N1190	N1191	N1195	N1194	gen Conc3LW	8		Yes
896	P912	N1191	N1192	N1196	N1195	gen Conc3LW	8		Yes
897	P913	N1192	N1193	N1197	N1196	gen Conc3LW	8		Yes
898	P914	N1193	N1194	N1198	N1197	gen Conc3LW	8		Yes
899	P915	N1194	N1195	N1199	N1198	gen Conc3LW	8		Yes
900	P916	N1195	N1196	N234	N1199	gen Conc3LW	8		Yes



**Plates (Continued)**

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
958 P970	N1257	N1258	N1262	N1261	gen. Conc3LW	8		Yes
959 P971	N1258	N1259	N1263	N1262	gen. Conc3LW	8		Yes
960 P972	N1259	N1260	N1264	N1263	gen. Conc3LW	8		Yes
961 P972A	N2	N1264	N1267	N1255	gen. Conc3LW	8		Yes
962 P973	N1264	N1265	N1268	N1267	gen. Conc3LW	8		Yes
963 P974	N1265	N1266	N1269	N1268	gen. Conc3LW	8		Yes
964 P975	N1266	N1303	N1270	N1269	gen. Conc3LW	8		Yes
965 P976	N1255	N1267	N1271	N1260	gen. Conc3LW	8		Yes
966 P977	N1267	N1268	N1272	N1271	gen. Conc3LW	8		Yes
967 P978	N1268	N1269	N1273	N1272	gen. Conc3LW	8		Yes
968 P979	N1269	N1270	N1274	N1273	gen. Conc3LW	8		Yes
969 P980	N1260	N1271	N1275	N7	gen. Conc3LW	8		Yes
970 P981	N1270	N1272	N1276	N1275	gen. Conc3LW	8		Yes
971 P982	N1272	N1273	N1277	N1276	gen. Conc3LW	8		Yes
972 P983	N1273	N1274	N108	N1277	gen. Conc3LW	8		Yes
973 P983A	N103	N1278	N1281	N1270	gen. Conc3LW	8		Yes
974 P984	N1278	N1279	N1282	N1281	gen. Conc3LW	8		Yes
975 P985	N1279	N1280	N1283	N1282	gen. Conc3LW	8		Yes
976 P986	N1280	N204	N1284	N1283	gen. Conc3LW	8		Yes
977 P987	N1270	N1281	N1285	N1274	gen. Conc3LW	8		Yes
978 P988	N1281	N1282	N1286	N1285	gen. Conc3LW	8		Yes
979 P989	N1282	N1283	N1287	N1286	gen. Conc3LW	8		Yes
980 P990	N1283	N1284	N1288	N1287	gen. Conc3LW	8		Yes
981 P991	N1274	N1285	N1289	N108	gen. Conc3LW	8		Yes
982 P992	N1285	N1286	N1290	N1289	gen. Conc3LW	8		Yes
983 P993	N1286	N1287	N1291	N1290	gen. Conc3LW	8		Yes
984 P994	N1287	N1288	N209	N1291	gen. Conc3LW	8		Yes
985 P994A	N87	N1292	N1248	N80	gen. Conc3LW	8		Yes
986 P995	N1292	N1293	N1249	N1248	gen. Conc3LW	8		Yes
987 P996	N1293	N1294	N1250	N1249	gen. Conc3LW	8		Yes
988 P997	N1294	N31	N2	N1250	gen. Conc3LW	8		Yes
989 P997A	N31	N1295	N1264	N2	gen. Conc3LW	8		Yes
990 P998	N1295	N1296	N1265	N1264	gen. Conc3LW	8		Yes
991 P999	N1296	N1297	N1266	N1265	gen. Conc3LW	8		Yes
992 P1000	N1297	N132	N103	N1266	gen. Conc3LW	8		Yes
993 P1000A	N132	N1298	N1278	N103	gen. Conc3LW	8		Yes
994 P1001	N1298	N1299	N1279	N1278	gen. Conc3LW	8		Yes
995 P1002	N1299	N1300	N1280	N1279	gen. Conc3LW	8		Yes
996 P1003	N1300	N233	N204	N1280	gen. Conc3LW	8		Yes
997 P1003A	N81	N1301	N1305	N1304	gen. Conc3LW	8		Yes
998 P1004	N1301	N1302	N1305	N1304	gen. Conc3LW	8		Yes
999 P1005	N1302	N1303	N1307	N1306	gen. Conc3LW	8		Yes
1000 P1006	N1303	N8	N1308	N1307	gen. Conc3LW	8		Yes
1001 P1007	N1304	N1305	N1310	N1309	gen. Conc3LW	8		Yes
1002 P1008	N1305	N1306	N1311	N1310	gen. Conc3LW	8		Yes
1003 P1009	N1306	N1307	N1312	N1311	gen. Conc3LW	8		Yes
1004 P1010	N1307	N1308	N1313	N1312	gen. Conc3LW	8		Yes
1005 P1011	N1309	N1310	N1315	N1314	gen. Conc3LW	8		Yes
1006 P1012	N1310	N1311	N1316	N1315	gen. Conc3LW	8		Yes
1007 P1013	N1311	N1312	N1317	N1316	gen. Conc3LW	8		Yes
1008 P1014	N1312	N1313	N1318	N1317	gen. Conc3LW	8		Yes
1009 P1015	N1314	N1315	N1320	N1319	gen. Conc3LW	8		Yes
1010 P1016	N1315	N1316	N1321	N1320	gen. Conc3LW	8		Yes
1011 P1017	N1316	N1317	N1322	N1321	gen. Conc3LW	8		Yes
1012 P1018	N1317	N1318	N1323	N1322	gen. Conc3LW	8		Yes
1013 P1019	N1319	N1320	N1292	N87	gen. Conc3LW	8		Yes
1014 P1020	N1320	N1321	N1293	N1292	gen. Conc3LW	8		Yes

**Plates (Continued)**

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness(in)	Inactive	Plane Str.
1015 P1021	N1321	N1322	N1294	N1293	gen. Conc3LW	8		Yes
1016 P1022	N1322	N1323	N31	N1284	gen. Conc3LW	8		Yes
1017 P1023	N8	N1324	N1327	N1308	gen. Conc3LW	8		Yes
1018 P1023	N1324	N1325	N1328	N1327	gen. Conc3LW	8		Yes
1019 P1024	N1325	N1326	N1329	N1328	gen. Conc3LW	8		Yes
1020 P1025	N1326	N1327	N1330	N1329	gen. Conc3LW	8		Yes
1021 P1026	N1327	N1328	N1331	N1330	gen. Conc3LW	8		Yes
1022 P1027	N1328	N1329	N1332	N1331	gen. Conc3LW	8		Yes
1023 P1028	N1329	N1330	N1333	N1332	gen. Conc3LW	8		Yes
1024 P1029	N1330	N1331	N1334	N1333	gen. Conc3LW	8		Yes
1025 P1030	N1331	N1332	N1335	N1334	gen. Conc3LW	8		Yes
1026 P1031	N1332	N1333	N1336	N1335	gen. Conc3LW	8		Yes
1027 P1032	N1333	N1334	N1337	N1336	gen. Conc3LW	8		Yes
1028 P1033	N1334	N1335	N1338	N1337	gen. Conc3LW	8		Yes
1029 P1034	N1335	N1336	N1339	N1338	gen. Conc3LW	8		Yes
1030 P1035	N1336	N1337	N1340	N1339	gen. Conc3LW	8		Yes
1031 P1036	N1337	N1338	N1341	N1340	gen. Conc3LW	8		Yes
1032 P1037	N1338	N1339	N1342	N1341	gen. Conc3LW	8		Yes
1033 P1038	N1339	N1340	N1343	N1342	gen. Conc3LW	8		Yes
1034 P1039	N1340	N1341	N1344	N1343	gen. Conc3LW	8		Yes
1035 P1040	N1341	N1342	N1345	N1344	gen. Conc3LW	8		Yes
1036 P1041	N1342	N1343	N1346	N1345	gen. Conc3LW	8		Yes
1037 P1041A	N109	N1343	N1346	N1345	gen. Conc3LW	8		Yes
1038 P1042	N1343	N1344	N1347	N1346	gen. Conc3LW	8		Yes
1039 P1043	N1344	N1345	N1348	N1347	gen. Conc3LW	8		Yes
1040 P1044	N1345	N210	N1349	N1348	gen. Conc3LW	8		Yes
1041 P1045	N1346	N1347	N1350	N1349	gen. Conc3LW	8		Yes
1042 P1046	N1347	N1348	N1351	N1350	gen. Conc3LW	8		Yes
1043 P1047	N1348	N1349	N1352	N1351	gen. Conc3LW	8		Yes
1044 P1048	N1349	N1350	N1353	N1352	gen. Conc3LW	8		Yes
1045 P1049	N1350	N1351	N1354	N1353	gen. Conc3LW	8		Yes
1046 P1050	N1351	N1352	N1355	N1354	gen. Conc3LW	8		Yes
1047 P1051	N1352	N1353	N1356	N1355	gen. Conc3LW	8		Yes
1048 P1052	N1353	N1354	N1357	N1356	gen. Conc3LW	8		Yes
1049 P1053	N1354	N1355	N1358	N1357	gen. Conc3LW	8		Yes
1050 P1054	N1355	N1356	N1359	N1358	gen. Conc3LW	8		Yes
1051 P1055	N1356	N1357	N1360	N1359	gen. Conc3LW	8		Yes
1052 P1056	N1357	N1358	N1361	N1360	gen. Conc3LW	8		Yes
1053 P1057	N1358	N1359	N1362	N1361	gen. Conc3LW	8		Yes
1054 P1058	N1359	N1360	N1363	N1362	gen. Conc3LW	8		Yes
1055 P1059	N1360	N1361	N233	N1360	gen. Conc3LW	8		Yes
1056 P1060	N1361	N233	N1360	N1360	gen. Conc3LW	8		Yes

**Rigid Diaphragms**

	Joint Label	Plane	Type	Inactive
1	N37	XY	Membrane	
2	N138	XY	Membrane	
3	N239	XY	Membrane	

**Joint Loads and Enforced Displacements (BLC 2 : n-s base shear +5%)**

	Joint Label	L,D,M	Direction	Magnitude(k-ft in rad k*s^2/ft)
1	N68	L	Y	2230
2	N167	L	Y	3823
3	N268	L	Y	4567

**Joint Loads and Enforced Displacements (BLC 3 : n-s base shear -5%)**

	Joint Label	L,D,M	Direction	Magnitude(k-ft in rad k*s^2/ft)
1	N67	L	Y	2230
2	N168	L	Y	3823
3	N269	L	Y	4567

**Joint Loads and Enforced Displacements (BLC 4 : e-w base shear +5%)**

	Joint Label	L,D,M	Direction	Magnitude(k-ft in rad k*s^2/ft)
1	N68	L	X	2230
2	N169	L	X	3823
3	N270	L	X	4567

**Joint Loads and Enforced Displacements (BLC 5 : e-w base shear -5%)**

	Joint Label	L,D,M	Direction	Magnitude(k-ft in rad k*s^2/ft)
1	N68	L	X	2230
2	N170	L	X	3823
3	N271	L	X	4567

**Joint Loads and Enforced Displacements (BLC 6 : n-s base shear)**

	Joint Label	L,D,M	Direction	Magnitude(k-ft in rad k*s^2/ft)
1	N65	L	Y	2230
2	N166	L	Y	3823
3	N267	L	Y	4567

**Joint Loads and Enforced Displacements (BLC 7 : e-w base shear)**

	Joint Label	L,D,M	Direction	Magnitude(k-ft in rad k*s^2/ft)
1	N65	L	X	2230
2	N166	L	X	3823
3	N267	L	X	4567

**Joint Loads and Enforced Displacements (BLC 8 : test)**

	Joint Label	L,D,M	Direction	Magnitude(k-ft in rad k*s^2/ft)
1	N205	L	Y	1000

**Basic Load Cases**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area (Me. Surface)
2	n-s base shear +5%	None				3		
3	n-s base shear -5%	None				3		
4	e-w base shear +5%	None				3		
5	e-w base shear -5%	None				3		
6	n-s base shear	None				3		
7	e-w base shear	None				3		
8	test	None				1		

**Load Combinations**

	Description	Sol., PD., SR.	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor
1	n-s base shear +5% Yes	2	1						
2	n-s base shear -5% Yes	3	1						
3	e-w base shear +5% Yes	4	1						
4	e-w base shear -5% Yes	5	1						
5	n-s base shear Yes	6	1						
6	e-w base shear Yes	7	1						
7	test Yes	8	1						

**Envelope Joint Reactions**

	Joint	X (k)	Y (k)	Z (k)	MX (k-ft)	MY (k-ft)	MZ (k-ft)
1	N76	max -114.004	2	0	7	17.072	2
2		min -3416.952	4	0	3	-1369.532	4
3	N74	max 1143.271	2	0	4	255.746	2
4		min -3666.178	4	0	2	-1268.598	4
5	N75	max 0	1	866.652	3	0	1
6		min 0	1	-1670.065	2	8	0
7	N72	max 317.577	1	0	1	182.659	1
8		min -2074.531	3	0	3	-910.373	3
9	N73	max 142.062	1	0	1	86.79	1
10		min -2048.828	3	0	3	-925.877	3
11	N71	max 0	2	32.925	3	23.873	3
12		min 0	4	-2240.55	1	-1050.217	1
13	N92	max 0	4	0	1	1089.399	1
14		min 0	2	0	1	-23.861	3
15	N70	max 0	2	12.074	3	9.598	3
16		min 0	4	-2125.553	1	-961.919	1
17	N91	max 0	4	0	1	1023.239	1
18		min 0	2	0	1	-10.483	3
19	N78	max 0	1	0	1	714.478	3
20		min 0	1	0	7	-207.853	1
21	N77	max 607.261	1	248.356	3	34.747	7
22		min -1747.487	3	-856.018	1	-685.448	3
23	N97	max 0	4	0	1	898.351	1
24		min 0	2	0	1	-239.583	3
25	N81	max 0	1	0	3	853.977	3
26		min 0	1	0	1	-170.881	1
27	N82	max 0	1	0	3	926.991	3
28		min 0	1	0	7	-86.849	1
29	N79	max 0	1	0	1	2454.796	4
30		min 0	1	0	1	-1507.228	1
31	N100A	max 0	3	909.611	4	234.516	4
32		min 0	1	-5590.365	2	-1879.072	2
33	N101	max 0	4	0	1	1879.316	2
34		min 0	2	0	1	-234.503	4
35	N80	max 0	1	1	1	90.054	1
36		min 0	3	0	3	-406.006	3
37	N265A	max 0	1	0	1	17.777	7
38		min 0	3	0	1	-495.103	3
39	N98	max 0	4	0	1	308.057	1
40		min 0	7	0	1	-425.547	3
41	N282	max 0	3	0	1	660.202	1
42		min 0	1	0	1	-391.176	1
43	N287	max 0	1	0	1	1082.607	1
44		min 0	3	0	1	-385.112	3
45	N320	max 0	2	0	1	279.28	4
46		min 0	4	0	1	-2390.622	2
47	N325	max 0	4	0	1	187.807	4
48		min 0	2	0	1	-1687.251	1
49	N330	max 0	2	0	1	127.936	4
50		min 0	4	0	1	-1185.911	2
51	N335	max 0	4	0	1	80.346	4
52		min 0	2	0	1	-760.24	2
53	N340	max 0	2	0	1	38.884	4
54		min 0	4	0	1	-37.199	4
55	N345	max 0	3	0	1	199	2
56		min 0	1	0	1	0.111	4

Envelope Joint Reactions (Continued)

Joint		X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
57	N350	max	0	1	372.391	2	0
58		min	0	3	-38.862	4	0
59	N355	max	0	3	78.257	2	0
60		min	0	1	-80.324	4	0
61	N360	max	0	1	1186.332	2	0
62		min	0	3	-127.914	4	0
63	N365	max	0	3	1687.683	2	0
64		min	0	1	-187.785	4	0
65	N370	max	0	1	2391.062	2	0
66		min	0	3	-279.257	4	0
67	N538	max	0	2	13.029	3	0
68		min	0	4	-1207.939	1	0
69	N543	max	0	4	9.523	3	0
70		min	0	2	-849.829	1	0
71	N90A	max	0	2	6.993	3	0
72		min	0	4	-609.991	1	0
73	N551	max	0	4	3.938	3	0
74		min	0	2	-241.158	1	0
75	N556	max	0	4	248	3	0
76		min	0	2	-24.02	1	0
77	N94	max	0	2	272.16	1	0
78		min	0	4	-3.2	3	0
79	N486	max	0	4	868.544	1	0
80		min	0	2	-9.759	3	0
81	N481	max	0	4	551.243	1	0
82		min	0	2	-6.366	3	0
83	N491	max	0	2	1278.46	1	0
84		min	0	4	-13.772	3	0
85	N618	max	0	1	905.827	3	0
86		min	0	1	4.292.237	1	0
87	N613	max	0	1	656.771	3	0
88		min	0	1	-253.935	1	0
89	N608	max	0	1	477.403	3	0
90		min	0	1	-234.78	1	0
91	N100	max	0	1	325.344	3	0
92		min	0	1	-224.002	1	0
93	N682	max	0	1	186.826	3	0
94		min	0	1	-219.788	1	0
95	N677	max	0	1	53.862	3	0
96		min	0	1	-22.772	1	0
97	N672	max	0	1	34.871	7	0
98		min	0	1	-235.251	1	0
99	N667	max	0	1	32.072	7	0
100		min	0	1	-262.073	1	0
101	N662	max	0	1	31.587	7	0
102		min	0	1	-395.094	3	0
103	N730	max	0	1	30.591	3	0
104		min	0	1	-1318.835	3	0
105	N735	max	0	7	21.934	3	0
106		min	0	4	-916.076	1	0
107	N740	max	0	2	14.766	3	0
108		min	0	4	-604.581	1	0
109	N745	max	0	4	8.096	3	0
110		min	0	7	-328.32	1	0
111	N93	max	0	7	1.161	3	0
112		min	0	4	-46.928	1	0
113	N95	max	0	1	296.323	1	0

Envelope Joint Reactions (Continued)

Joint		X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
114		min	0	3	-7.336	3	0
115	N806	max	0	3	589.043	1	0
116		min	0	1	-14.428	3	0
117	N811	max	0	2	927.396	1	0
118		min	0	4	-22.254	3	0
119	N816	max	0	1	1363.584	1	0
120		min	0	3	-31.68	3	0
121	N862	max	0	1	1596.118	4	0
122		min	0	1	-1044.073	2	0
123	N857	max	0	1	972.296	4	0
124		min	0	1	-740.584	2	0
125	N90	max	0	1	501.769	4	0
126		min	0	1	-547.717	2	0
127	N878	max	0	1	107.595	4	0
128		min	0	1	-411.162	2	0
129	N873	max	0	1	34.973	7	0
130		min	0	1	-315.515	2	0
131	N83	max	0	1	60.462	7	0
132		min	0	1	-639.238	4	0
133	N891	max	0	1	88.796	7	0
134		min	0	1	-1077.772	4	0
135	N886	max	0	1	56.011	2	0
136		min	0	1	-1685.383	4	0
137	N1063	max	0	1	844.254	2	0
138		min	0	1	35.365	7	0
139	N1068	max	0	1	633.115	2	0
140		min	0	1	33.799	7	0
141	N89	max	0	1	358.463	2	0
142		min	0	1	13.027	7	0
143	N86	max	0	1	290.177	2	0
144		min	0	1	-107.795	4	0
145	N986	max	0	1	385.141	2	0
146		min	0	1	-330.953	4	0
147	N991	max	0	1	351.904	2	0
148		min	0	1	-565.252	4	0
149	N996	max	0	1	333.296	2	0
150		min	0	1	-829.339	4	0
151	N1001	max	0	1	330.555	2	0
152		min	0	1	-1149.13	4	0
153	N1006	max	0	1	362.255	2	0
154		min	0	1	-1620.756	4	0
155	N1095	max	0	1	1515.231	4	0
156		min	0	1	-642.439	2	0
157	N1100	max	0	1	1136.268	4	0
158		min	0	1	-102.482	2	0
159	N1105	max	0	1	906.675	4	0
160		min	0	1	67.299	7	0
161	N85	max	0	1	1054.028	3	0
162		min	0	1	-104.09	1	0
163	N1152	max	0	1	612.181	3	0
164		min	0	1	-62.659	1	0
165	N1157	max	0	1	373.84	3	0
166		min	0	1	-38.918	1	0
167	N1162	max	0	1	161.693	3	0
168		min	0	1	-16.989	1	0
169	N88	max	0	1	6.22	1	0
170		min	0	1	-59.31	3	0

Envelope Joint Reactions (Continued)

Joint		X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
171	N1200	max	0	1	36.078	1	0
172		min	0	1	-345.541	3	0
173	N1205	max	0	1	69.392	1	0
174		min	0	1	-676.198	3	0
175	N1210	max	0	1	111.026	1	0
176		min	0	1	-1121.806	3	0
177	N1304	max	0	1	1058.884	3	0
178		min	0	1	-222.408	1	0
179	N1309	max	0	1	690.509	3	0
180		min	0	1	-149.7	1	0
181	N1314	max	0	1	420.284	3	0
182		min	0	1	-92.631	1	0
183	N1319	max	0	1	183.276	3	0
184		min	0	1	-40.644	1	0
185	N87	max	0	1	18.027	1	0
186		min	0	1	-80.176	3	0
187	N1251	max	0	1	151.467	1	0
188		min	0	1	-695.302	3	0
189	N1256	max	0	1	235.024	1	0
190		min	0	1	-1115.007	3	0
191	Totals:	0.15	1	0.07	3	0	2
192		min	-10619.937	3	-10619.913	1	0

Envelope Drift Report

Story	Joint	X-Drift [in]	Y-Drift [in]	Z-Drift [in]	Ht [%]
1	1	max	N37	1.081	4
2	1	min	N37	-0.335	2

Description:

All existing walls

Level:

IO

m =

1.5

Wall no.	thickness, in	length, ft	controlling load case	max shear, kips	ampli- fication factor, Ax	max shear w/o torsion, kips	max shear from perp seismic	ampl max shear + 30% perp seismic	max shear, klf	allow shear, klf	Pass?
1	8	25	3	2136	1	1526	991	2433	65	36	NO
2	8	25	3	2124	1	1811	544	2287	61	36	NO
3	8	26	4	3557	3	2917	1061	5155	132	36	NO
4	8	26	4	3820	3	3053	875	5617	144	36	NO
5	8	10	2	511	3	377	282	864	58	36	NO
6	12	28	2	6930	3	6066	1734	9178	219	117	NO
7	8	10	1	840	1.25	664	244	957	64	36	NO
8	8	20	3	1797	1	1317	464	1936	65	36	NO
9	8	20	1	2139	1.25	1819	738	2440	81	36	NO
10	8	20	1	2194	1.25	1694	1130	2658	89	36	NO

MLA Engineering, PLLC  
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JOB SeaTac CH.

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY DP DATE 5/21/07

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

### Check diaphragm capacity

Floors  $4\frac{1}{2}"$  thick

$f'_c = 4000$  psi

reinf:  $6 \times 6$  - w1.4  $\times$  w1.4 WWF (assume 65 ksi)

$$V_n = A_w (2\sqrt{f'_c} + \rho_n f_y)$$

expected strengths:  $f'_c = (4 \text{ ksi})(1.25) = 5000 \text{ psi}$   
 $f_y = 65 (1.25) = 81 \text{ ksi}$

$$\begin{aligned} V_n &= (4.5") \underset{\substack{\uparrow \\ f_y}}{(12") (2\sqrt{5000})} + (.03 \text{ in}^2/\text{ft}) (81 \text{ ksi}) \\ &= \underline{10.1 \text{ klf}} \end{aligned}$$

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JOB SeaTac C.H.  
SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_  
CALCULATED BY DP DATE 5/21/07  
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_  
SCALE \_\_\_\_\_

4.2.2.1.4 Diaphragm load distribution:

$$F_{px} = \frac{1}{C} \frac{\sum F_i}{\sum w_i} w_x$$

table 3-4

C = 1.1

Story	$w_x$	$\sum w_i$	$F_x$	$\sum F_i$	$F_{px}$	(10620k) % of base shear
Roof	3000k	3000	4567	4567	4152	.39
3	3750	6750	3823	8390	4237	.40
2	4200	10950	2230	10620	3703	.34

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CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

### Diaphragm loads

3rd floor & roof are  $\approx 40\%$  of base shear ratio

	Wall	max wall load	adjacent diaph. length	$V_1$ kip	$v/m$ $I.D. (m=1.5)$	$L.S. (m=2.5)$
Only controlling load cases analyzed	1	<del>2433k</del>				
	2	2287	16'	143	95 kip	57 kip
	3	<del>5155</del>				
	4	5617	18'	312	208 kip	125 kip
	5	<del>864</del>				
	6	<del>9178</del>				
	7	<del>957</del>				
	8	<del>1936</del>				
	9	<del>2440</del>				
	10	2658	19'	140	93 kip	56 kip

↑                      ↑

ANSWERS

diaphragm loads at shearwalls exceed capacities for both I.D. & L.S.

JOB SeaTac CH.

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY DP DATE 5/24/67

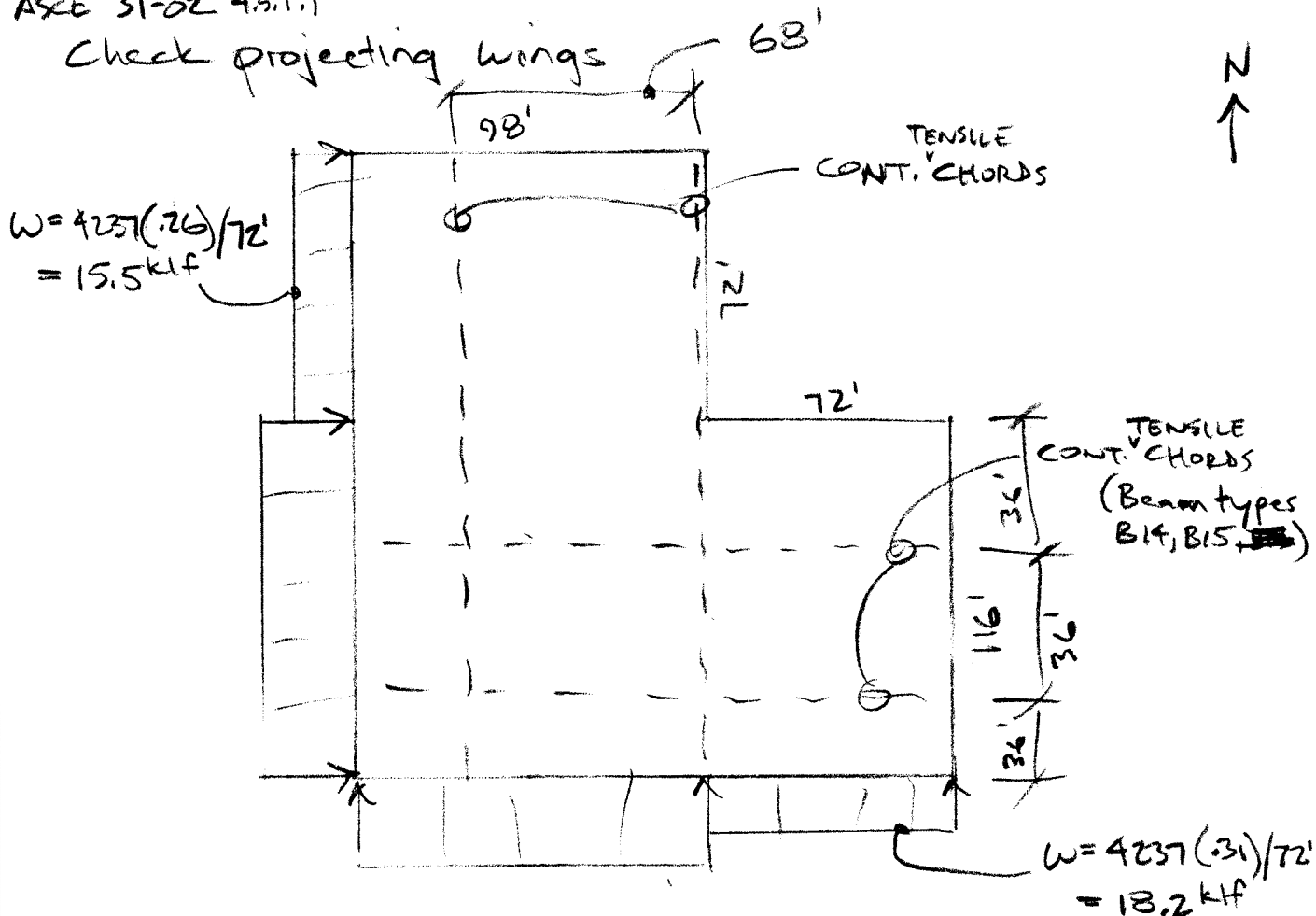
CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

MLA Engineering, pllc  
(206) 264-2727

ASCE 31-02 4.5.1.7

Check projecting wings



3RD FLOOR DIAPHRAGM

( $F_{px} = 4237k$ )

By inspection, worst case is N-S load

$$M = 18.2klf (72')^2 / 2 = 47174 k' \quad \checkmark \text{ m for I.O.}$$

$$T = C = 47174 / 72' = 655k \div 1.5 = 437k$$

$$\text{reqd } A_s = \frac{437k}{60ksi(1.25)} = 5.8 \text{ in}^2$$

Beams B14, B15: (2) #10 + (4) #11 total  $A_s = 8.78 \text{ in}^2$  ok

Chords ok for projecting wings



MLA Engineering, PLLC  
(206) 264-2727

JOB SeaTac C.H.

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY DP DATE 5/24/87

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

## Deflection compatibility

All columns are 24"  $\square$  - assume reinf.  $\rho = .01$   
(min. steel)

Col. at grids A/9

$$\text{trib area ea. floor} = \frac{32'}{2} \times \frac{32'}{2} = 256 \text{ sf.}$$

$$\begin{aligned} \text{Roof: } D &= 112 \text{ psf} \\ L &= 40 \text{ psf} \end{aligned}$$

$$\begin{aligned} \text{3rd } D &= 140 \text{ psf} \\ L &= 80 \text{ psf} \end{aligned}$$

$$\begin{aligned} \text{2nd } D &= 140 \text{ psf} \\ L &= 250 \text{ psf (storage)} \end{aligned}$$

$$\Sigma D = [112 + (140)(2)](256) = 100.4 \text{ k}$$

4.2.4.2

$$\begin{aligned} \Sigma L &= (.25 [40 + 80] + 250)(256) = 71.7 \text{ k} \\ &\underline{\underline{\Sigma 172 \text{ k}}} \end{aligned}$$

$$1.1 (172 \text{ k}) = \underline{\underline{189 \text{ k}}}$$

$$\text{Max } \Delta = 1.18''$$

Per Enercalc, column is ok

Title :  
Dsgnr:  
Description :

Job #  
Date: 2:29PM, 22 MAY 07

Scope :

Rev: 580003  
User: KW-0603492, Ver 5.8.0, 1-Nov-2006  
(c)1983-2006 ENERCALC Engineering Software

## Rectangular Concrete Column

Page 1  
project.ecw:Calculations

**Description** Column at grids A/9

### General Information

Code Ref: ACI 318-02, 1997 UBC, 2003 IBC, 2003 NFPA 5000

Width	24.000 in	f <sub>c</sub>	4,000.0 psi	Total Height	14.000 ft
Depth	24.000 in	F <sub>y</sub>	60,000.0 psi	Unbraced Length	14.000 ft
Rebar:		Seismic Zone	3	Eff. Length Factor	1.000
3- # 9 d =	2.000 in	LL & ST Loads Act Together		Column is BRACED	
3- # 9 d =	22.000 in				

### Loads

Note: Load factoring supports 2003 IBC and 2003 NFPA 5000 by virtue of their references to ACI 318-02 for concrete design.  
Factoring of entered loads to ultimate loads within this program is according to ACI 318-02 C.2

	<u>Dead Load</u>	<u>Live Load</u>	<u>Short Term</u>	<u>Eccentricity</u>
Axial Loads	0.000 k	189.000 k	k	1.400 in

### Summary

Column is OK

24.00 x 24.00in Column, Rebar: 3-#9 @ 2.00in, 3-#9 @ 22.00in

	<u>ACI C-1</u>	<u>ACI C-2</u>	<u>ACI C-3</u>
Applied : Pu : Max Factored	189.00 k	189.00 k	0.00 k
Allowable : P <sub>n</sub> * Phi @ Design Ecc.	1,194.96 k	1,194.96 k	1,194.96 k
M-critical	22.05 k-ft	22.05 k-ft	0.00 k-ft
Combined Eccentricity	1.400 in	1.400 in	1.400 in
Magnification Factor	1.00	1.00	1.00
Design Eccentricity	1.400 in	1.400 in	1.400 in
Magnified Design Moment	22.05 k-ft	22.05 k-ft	0.00 k-ft
Po * .80	1,838.40 k	1,838.40 k	1,838.40 k
P : Balanced	892.90 k	892.90 k	892.90 k
Ecc : Balanced	10.458 in	10.458 in	10.458 in

### Slenderness

per ACI 318-95 Section 10.12 & 10.13

Actual k Lu / r	23.333	Elastic Modulus	3,605.0 ksi	Beta	0.850
		<u>ACI Eq. C-1</u>	<u>ACI Eq. C-2</u>	<u>ACI Eq. C-3</u>	
Neutral Axis Distance		26.3450 in	26.3450 in	26.3450 in	
Phi		0.6500	0.6500	0.6500	
Max Limit kl/r		34.0000	34.0000	34.0000	
Beta = M:sustained/M:max		0.0000	0.0000	1.0000	
Cm		1.0000	1.0000	1.0000	
EI / 1000		0.00	0.00	0.00	
Pc : pi^2 EI / (k Lu)^2		0.00	0.00	0.00	
alpha: MaxPu / (.75 Pc)		0.0000	0.0000	0.0000	
Delta		1.0000	1.0000	1.0000	
Ecc: Ecc Loads + Moments		1.400	1.400	1.400 in	
Design Ecc = Ecc * Delta		1.400	1.400	1.400 in	

### ACI Factors (per ACI 318-02, applied internally to entered loads)

ACI C-1 & C-2 DL	1.000	ACI C-2 Group Factor	1.000	Add'l "1.4" Factor for Seismic	1.000
ACI C-1 & C-2 LL	1.000	ACI C-3 Dead Load Factor	1.000	Add'l "0.9" Factor for Seismic	1.000
ACI C-1 & C-2 ST	1.000	ACI C-3 Short Term Factor	1.000		
....seismic = ST * :	1.000				

### Summary of Immediate Occupancy deficiencies

Deficiency	Tier 1	Tier 2	Tier 2 ref. section
Shearwall overturning	fails	fails	4.7.3.2
Concrete wall cracks	fails	fails	4.3.3.9
Shear stress check	fails	fails	4.4.2.2.1
Deflection compatibility	fails	passes	4.4.1.6.2
Diaphragm openings at shearwalls	fails	fails	4.5.1.4
Plan irregularities	fails	passes	4.5.1.7

## *APPENDIX G*



W E T H E R H O L T   A N D   A S S O C I A T E S ,   I N C .

## BUILDING ENVELOPE EVALUATION

**SEATAC CITY HALL**  
**4800 S 188<sup>th</sup> Street**  
**SeaTac, Washington 98188**



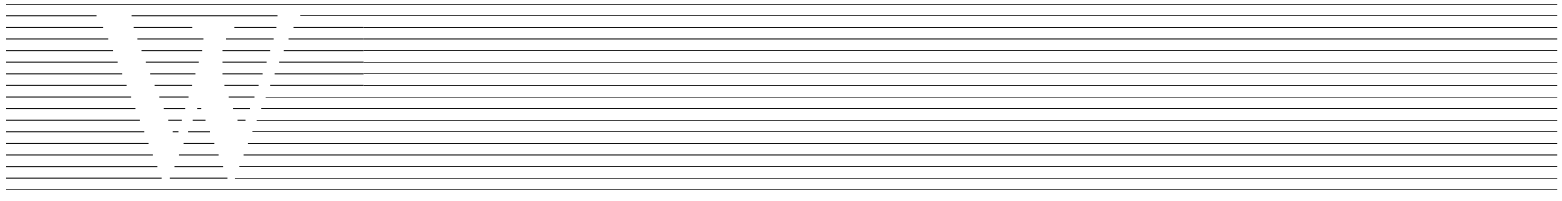
For

ARC Architects | Architecture Resource Collaborative  
119 S Main Street, Suite 200  
Seattle, Washington 98104

Attn: Daniel Podoll

Job # 2007-13B1  
October 14, 2020

14715 NE 95<sup>th</sup> Street   Suite 100   Redmond, WA 98052  
Phone: 425-822-8397   Fax: 425-822-7595



W E T H E R H O L T   A N D   A S S O C I A T E S ,   I N C .

October 14, 2020

Job # 2007-13B1

ARC Architects | Architecture Resource Collaborative  
119 S Main Street, Suite 200  
Seattle, Washington 98104

Phone # (206) 900-0332

Attn: Daniel Podoll

Sent Via Email: podoll@arcarchitects.com

Ref:     Building Envelope Evaluation  
         SeaTac City Hall  
         4800 S 188<sup>th</sup> Street  
         SeaTac, Washington 98188

Greetings,

At the request of Daniel Podoll, this writer visited the above referenced site on September 2, 2020 to perform a building envelope evaluation as part of an overall facility condition assessment.

Our visual evaluation included a review of the roof, exterior walls and related flashings. Review of windows, curtain walls and glazing systems was not included. One roof core was performed and temporarily patched upon receiving verbal approval from Brian Ruda, Facilities Manager, to verify the roof assembly.

Exterior walls were assessed from grounds with the use of binoculars or with a ladder where safely accessible.

Plans provided did not provide additional information on the building envelope as these were primarily generated as part of tenant improvement when the building was acquired in 2002. No records of any building envelope repairs, or roof replacement were made available for review.

Access to the roof was provided by Tom Atkins who has worked for the City of SeaTac for 12 years and started working at the City Hall building about 6 months ago. Roof access is via a staircase penthouse.

Weather at the time of our evaluation was clear and about 68 degrees Fahrenheit.,

**Items of Understanding**

From conversation onsite with Brian Ruda and/or Tom Atkins, and online research, we understand the following:

- The City of SeaTac dedicated the building as its official City Hall on November 26, 2002. From public records on King County Department of Assessments webpage, the building was constructed in 1979.
- Water intrusion has been known to occur within the front stairwell (west stairs) during heavy rain events. No other known leaking was reported.
- Based on historical aerial imagery, the original roof appeared to be either a smooth surfaced built-up roof (BUR) or EPDM roof system. In 2002/2003, a cell site antenna and associated rooftop equipment was placed near the southeast corner of the roof and near the south elevation of the east staircase penthouse, respectively. In 2006/2007, modifications to the cell site equipment appeared to have been performed which included a larger shrouded platform and possibly additional antennae. A white reflective roof membrane was installed in 2010/2011, likely the one currently installed which may carry a warranty.

## Observations

### Roof

The roof area, including the staircase penthouse, measures approximately 26,285 square feet. The roof system assembly, based on a core cut performed, consists of, from bottom to top; concrete deck, asphalt flood coat, about 3.5-inches of rigid polyisocyanurate insulation, single-ply membrane, ¼-inch DOW extruded polystyrene insulation (XPS), and a mechanically fastened single ply membrane.

Note that the core cut was performed adjacent the cell site rooftop equipment and may be a patch or recover assembly based on the presence of two single ply membranes. The insulation and single-ply membrane layers observed at the core cut are mechanically attached to the concrete deck.

Determination on selecting a core cut location was based on a spot check for moisture content with the use of a non-destructive Tramex RWS impedance moisture meter. The area of the core, and to the north between the east staircase penthouse and the cell site equipment, felt soft when walked on and demonstrated high relative moisture content readings. The core confirmed the presence of moisture on the organic facer of the polyisocyanurate insulation, that was further corroborated with the use of a Delmhorst BD-2100 probe type moisture meter.

We were unable to identify the type of single ply roofing membrane during the site visit. Depending on the manufacturer and the formulation used, in some instances, an incompatible reaction can occur between PVC membranes and XPS foam insulation caused by plasticizer migration. This can cause the membrane to stain or shrink, and create issues with the mechanical attachment. At the time however, there did not appear to be any obvious signs of this occurring.

Roofing is terminated at the parapets with adhered single ply wall flashing membrane and standing seam stainless steel coping. The coping was observed, and verbalized onsite to Mr. Atkins, as being at risk of blowing off in several locations due to not being engaged into the cleat along the exterior return. The cleat also serves as a roof-to-wall flashing that is lapped by the wall flashing membrane and extends out over stainless steel roof panels as an overhang around the majority of the building perimeter.


The stainless steel roof panels themselves were observed to be in good condition, with the exception of gaskets between panels that are deteriorating and displaced.

At cast-in-place walls that extend perpendicular to the parapet and partially bisect the roof, the wall flashing membrane is secured along the top edge with mechanically fastened termination bar and is covered with a two-piece reglet and counterflashing metal. The reglet appeared to be inset into a saw-cut and was topically applied with sealant along the top edge. A similar condition is present at roof-to-wall conditions along the base of the penthouse and where the metal roof panels meet the cast-in-place walls.

The exposed cast-in-place wall above the roofing terminations has some cracks which could allow water migration behind the roofing or into the building.

The counterflashing installation is excluded where the termination bar turns vertical at the leading edges of the wall flashing membrane at the transitions from parapet to cast-in place wall. The exposed termination bar and coping-to-wall junctions appeared to be susceptible to water intrusion. There are no transition "saddle" flashings where the parapet meets a cast-in-place wall. Instead, the wall flashing membrane and coping metal are simply tabbed up behind the counterflashing metal.



Figure 1 – Historical aerial image of roof from 6/2010 showing apparent BUR or EPDM assembly. Approximate location of core cut performed is denoted with  symbol.



Slope for drainage is provided in a 4-way configuration toward each of a total of seven 3.5-inch diameter cast iron drains. Slope appeared to be a minimum of ¼-inch per foot. However, some evidence of standing water was observed in spot locations in the field of the roof and between sleeper curbs that are set perpendicular to the slope. There are no overflow drains.

The east staircase penthouse roof showed several deficiencies with the roofing installation; having wall flashing membrane folded down back on to itself along the east perimeter, the wall flashing membrane not extending down the outside edge nor being sealed/integrated to the scupper, and the coping cap being in poor condition and top fastened.

Along the north perimeter of the east staircase penthouse roof, the concrete slab transitions to a steep slope and has what appeared to be an acrylic coating applied to the exposed surface of the concrete. The coping metal along this perimeter transitions to a peak edge flashing that extends out over the sloped roof section. The peak edge flashing, as the other sections of coping metal, showed corrosion, lifted ends and sealant dependent joints.

Evidence of leakage was observed by streak staining within the staircase penthouse that stem from the top of the sloped roof section along a cold joint with the exterior wall.

Penetrations through the roof include vent stacks, conduit, ducts, support stanchions and sleepers. Vent stacks are flashed with preformed boot flashings that are hot-air welded to the roof membrane and terminated with a band clamp around the pipe. Conduit and support stanchions, including those for the cell site platform and ducts, are flashed with pourable sealer inside a square clad-metal pocket. The clad-metal pocket appeared to be flanged out onto the roof where hot-air welded membrane is used to integrate with the roof. The pocket flashings were observed to have the pourable sealer separating from the edges and/or sumped, a common issue with these types of flashings, which could allow water to collect or infiltrate the roofing.

Duct penetrations appear to extend through a larger curbed opening. The curb height is relatively low in comparison to the industry standard of 8-inches. Wall flashing membrane integrates the curb with the roof membrane and sheet metal provides the transition from curb to duct. The sheet metal is sealant dependent at the miters and where it terminates against the duct.

Sleepers appeared to be wrapped or baseflashed with wall flashing membrane and capped with stainless steel sheet metal. The sleeper detailing looked appropriate with the exception of isolator springs and other components being fastened through the top surface of the caps that require routine maintenance to the sealant.

Similar to the sleepers, a sheet metal cap is installed under the curb or platform where the cell site equipment is placed. Anchor points through the cap are susceptible to water intrusion and more so where, in at least one location, the anchor was shifted leaving a fastener hole.

### *Exterior Walls*

Exterior elevations are primarily made up of double glazed aluminum framed strip windows between cast-in place fin walls and a fluted CMU base. Between the rows of strip windows, overhangs protrude out at an 8:12 slope with ribbed stainless steel panels returning down across the front to create a band around the building. Weep holes were observed in the bottom edge of the panels as they return inwardly at the soffit.

The cast-in place walls are painted and exhibited some cracking which is common for this type of construction. Cracks can allow water migration behind flashings or other building components similar to that described for the condition above the roof line. The cast-in-place walls are not capped with coping metal.

The strip windows contain a sub-sill and a head flashing below the soffit. Weeps are present in the bottom portion of the frame that are covered with debris and need clearing out.

Where the stainless steel panels meet the cast-in-place fin walls, surface mounted counterflashing is installed to provide an overlap of the L-metal transition flashing that extends under the last panel at each end. The surface mounted counterflashing is reliant on sealant to provide a seal to the wall along the top edge. The installation of butyl tape is typical behind the counterflashing at the fastening flange but could not be visually confirmed. Issues with failing sealant were observed along the top of the surface mounted counterflashing.

Adhesively failing sealant was observed at joints between the window jambs and cast-in-place walls.

## Discussion and Recommendations

### Roof

Based on our observations, the roof system should remain serviceable for another 5 years with routine maintenance and implementation of recommended repairs. The main concern is the dependency on sealant at roof terminations which should be considered a regular maintenance item and the moisture identified in the roof adjacent the rooftop cell site equipment.

The following repair and maintenance items should be considered in an effort to reduce potential leakage and promote serviceability of the roof:

- 1) Cut out and remove all wet insulation and replace with new to restore the roof assembly.
- 2) Top off all clad metal pockets with pourable sealer to allow water to runoff.
- 3) Routinely monitor and replace all exposed sealant where craze cracking or adhesively failing.
- 4) Rework/replace the parapet coping metal to ensure full engagement with the cleat and proper mechanical securement.
- 5) Replace deteriorated or loose gaskets between metal roof panels.
- 6) Provide a seal at fasteners through the sleepers and pan flashings.
- 7) Seal hole(s) left in pan flashing from removed or relocated fastener.
- 8) Remove all the coping and peak edge metal at the perimeter of the east staircase penthouse roof to allow for new wall flashing membrane to be installed well adhered, wrapping over and extending down the exterior edge. Replace the scupper box with a flanged clad-metal scupper that can be fully integrated and sealed with the new wall flashing membrane, and install an independent collector box with an overflow opening.
  - a. In conjunction, review options for coating, or roofing, the sloped concrete roof portion of the staircase penthouse or continuing the single-ply membrane installation in a fully adhered manner down to cover the sloped roof. Coating or single-ply membrane should extend down the outside face to cover the cold joint between slab and wall where water intrusion is occurring with mechanically fastened edge metal terminations.
- 9) Consider coating all exposed concrete surfaces with a high build vapor permeable elastomeric coating and installing a standing seam metal coping on the cast-in-place walls.

The roof should be re-evaluated at the 5 year mark from date of this report to verify if additional service life can be expected. A more extensive survey for moisture intrusion should be considered in the near future to identify the extent of entrapped moisture that needs removal and replacement with new dry roofing components to restore.

At time of reroof, the possibility of "skinning-off" the single-ply membrane(s) and salvaging the insulation could be an option based on the results of a moisture scan. The addition of rigid polyisocyanurate insulation to comply with current energy code requirements and a high compressive strength coverboard, both fully adhered, should be included as part of a new roof assembly. Further, options for providing overflow drains and applicable uplift resistance should be reviewed and provided as needed.

### Exterior Walls

The exterior walls should provide weatherproofing for the life of the building given that the following recommendations be considered and Items 2 - 4 are implemented every 3 to 5 years:

- 1) Refasten the surface mounted counterflashings where fastener is backing out near the southwest corner of the building.
- 2) Routinely monitor and replace all exposed sealant where craze cracking or adhesively failing around windows and along the top of surface mounted counterflashings.
- 3) Clean out all weep holes in the window sills.
- 4) Similar to the walls above the roof line, consider coating the exposed cast-in-place concrete with a high build vapor permeable elastomeric coating.
  - a. Cladding the concrete walls with an assembly that includes a weather resistive barrier (WRB) and siding panels would provide a more long-term less maintenance prone condition.

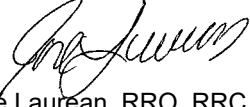
However, this option is considerably more intrusive and expensive, and would require replacing windows in order to flash and integrate the WRB into the rough openings.

This building envelope evaluation is intended to be general in nature and should not be considered a specification for bidding replacement or repairs.

Photographs taken during the site visit are included, and may contain additional information that should be considered part of this report.

We trust the roof evaluation report will be of assistance. If you have any questions, or if we may be of further service, please do not hesitate to call.

Respectfully,



José Laurean, RRO, RRC, RWC  
Field Engineer  
Wetherholt and Associates, Inc.

Reviewed by,



Don Davis, RRC, RWC, REWC, RBEC  
Senior Field Engineer / Principal  
Wetherholt and Associates, Inc.

Enclosures:      photographs

Please note that this building envelope evaluation is provided at the request of Daniel Podoll, whom we understand represents ARC Architects. No liability, warranty of merchantability, or guarantee of roofing or building envelope service life is accepted or implied. Wetherholt and Associates, Inc., is a neutral roofing, waterproofing, and building envelope consulting firm specializing in resolving building and water intrusion related issues.

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## Photographs



Photograph 1: Panoramic overview of the main roof as seen from the southwest corner.



Photograph 2: Southwest corner of main roof depicting cast-in-place fin walls bisecting the parapet.



Photograph 3: Closer view of previous photograph showing two-piece metal counterflashing overlapping wall flashing membrane and coping metal tab. Note exposed vertical termination bar (arrow) with topical sealant that requires routine monitoring and maintenance.



Photograph 4: View of tabbed up coping metal and single-ply membrane where the top of the parapet meets a cast-in-place fin wall.



Photograph 5: Typical two-piece counterflashing assembly that overlaps an L-metal transition flashing where the perimeter metal panel roof interfaces the cast-in-place walls.



Photograph 6: Similar location as referenced in previous photograph showing a failing sealant joint (sealant knife inserted) where the counterflashing transitions.





Photograph 7: Cast-in-place wall adjacent skylight over lobby showing counterflashing assembly to shield wall flashing membrane and painted concrete above. Note that top of wall is not capped and crack in concrete (arrow) that can allow water migration behind the roofing.



Photograph 8: Close up of previous showing crack in concrete wall.



Photograph 9: Overview of perimeter metal panel roof, showing roof-to-wall flashing/cleat and standing seam coping.



Photograph 10: Close up of parapet coping, showing underdriven screw fasteners along the inside return.



Photograph 11: Exterior view of coping metal not engaged into the roof-to-wall flashing/cleat and at risk of blow-off.



Photograph 12: Deteriorated and loose gasket between stainless steel roof panels.





Photograph 13: Exposed termination bar and susceptible counterflashing transition from roof down rake of lobby skylight against concrete wall.



Photograph 14: Lobby skylight rake condition where sealant along inset counterflashing is cohesively failing or discontinuous.



Photograph 15: Downslope edge of lobby skylight showing rake-to-eave transition. Note presence of a built-in sheet metal gutter.




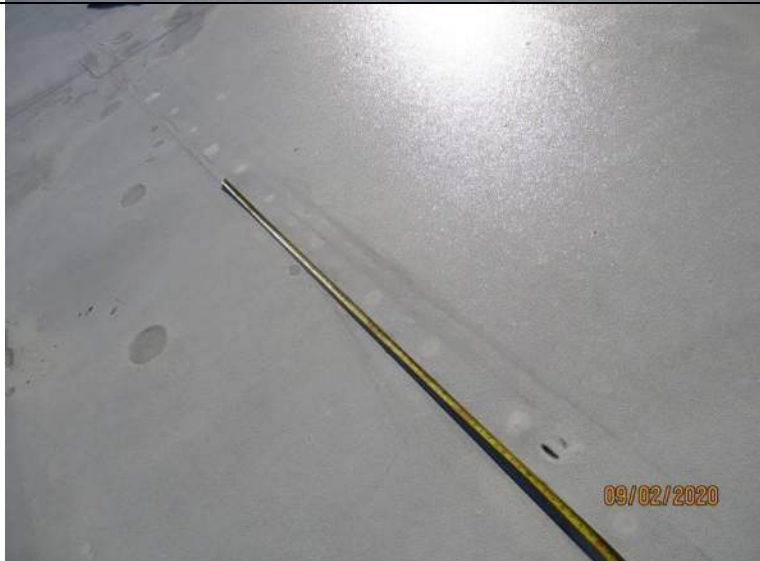

Photograph 16: Debris in built-in gutter.



Photograph 17: Context view of previous photos. Note lack of downspout to help control drainage.



Photograph 18: Stripped in rows of membrane fasteners at corner of main roof for added wind uplift resistance.

	<p>Photograph 19: In-seam membrane fasteners spaced at approximately 12-inches on center telegraphing through membrane due to thermal birding.</p>
	<p>Photograph 20: Measuring in-seam membrane fasteners at about 12-inch spacing.</p>
	<p>Photograph 21: Telegraphing of insulation board fastener plates under field of membrane. Estimated about 6 to 8 fasteners used per 4-foot by 8-foot board.</p>





Photograph 22: Staining on roof membrane showing some evidence of standing water adjacent roof drain.



Photograph 23: Context view of shrouded cell site antenna equipment at southeast corner of main roof.



Photograph 24: View of cell site antenna platform post with clad-metal pocket, filled with pourable sealer, to flash roof penetration and fabric faced butyl tape, similar to Eternabond WebSeal, used to cover the bolt connection points from post to sleeve under the steel I-beams.



Photograph 25: Closer view of previous showing roof tape.



Photograph 26: Context view of east staircase penthouse, east elevation. Note roof transition from low to steep slope.



Photograph 27: Sealant dependent flashing termination under door frame at sill, and at transition to roof counterflashing metal.



Photograph 28: Two-piece metal counterflashing at base of penthouse. Note continued reliance of sealant due to having exposed concrete walls above.



Photograph 29: Penthouse roof looking west.



Photograph 30: East perimeter of penthouse roof showing loose and folded down wall flashing membrane.





Photograph 31: Same location as previous showing how wall flashing membrane does not wrap the top of the wall. Note existing mineral surfaced membrane under the coping metal.



Photograph 32: Poor coping metal transition to peak edge metal.



Photograph 33: Poor coping metal condition and hole left from removed fastener.





Photograph 34: Peak edge metal flashing at north perimeter of penthouse roof, transition to steep slope.



Photograph 35: Topically applied sealant over joint in peak edge metal flashing.



Photograph 36: Scupper box at south edge of penthouse roof.



Photograph 37: Poor detailing at side of scupper box showing lack of proper integration and flashing.



Photograph 38: Underside of low slope penthouse roof showing pan decking under concrete.



Photograph 39: Penthouse roof, steep slope roof portion. Note streak staining from transition and along cold joint (arrows).



Photograph 40: Streak staining from cold joint between roof slab and wall at north elevation of east staircase penthouse.



Photograph 41: Same location as previous photograph as seen from the exterior, north elevation of penthouse.



Photograph 42: Adhesively failing sealant at cold joint.





Photograph 43: Context view of east staircase penthouse, north and west elevations.



Photograph 44: Cell site equipment and chiller next to south elevation of east staircase penthouse.



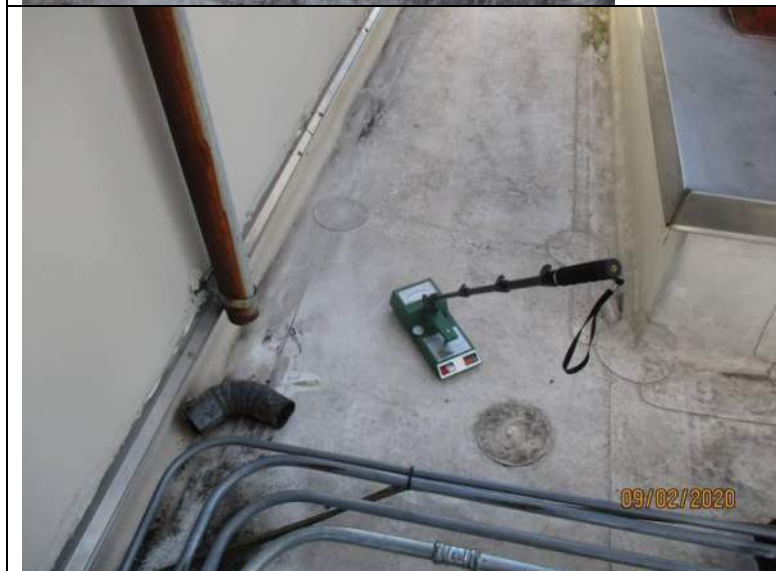
Photograph 45: Roof area between cell site equipment and penthouse that felt soft when walked on.



Photograph 46: Same area as referenced in previous photograph showing round membrane patch over fastener that is tenting the membrane.



Photograph 47: Close up of previous photograph showing membrane starting to split from fastener that is protruding over compressed/soft underlying insulation materials.



Photograph 48: Tramex RWS moisture meter used to detect an elevated moisture content level on a relative scale next to roof patch/tented membrane.

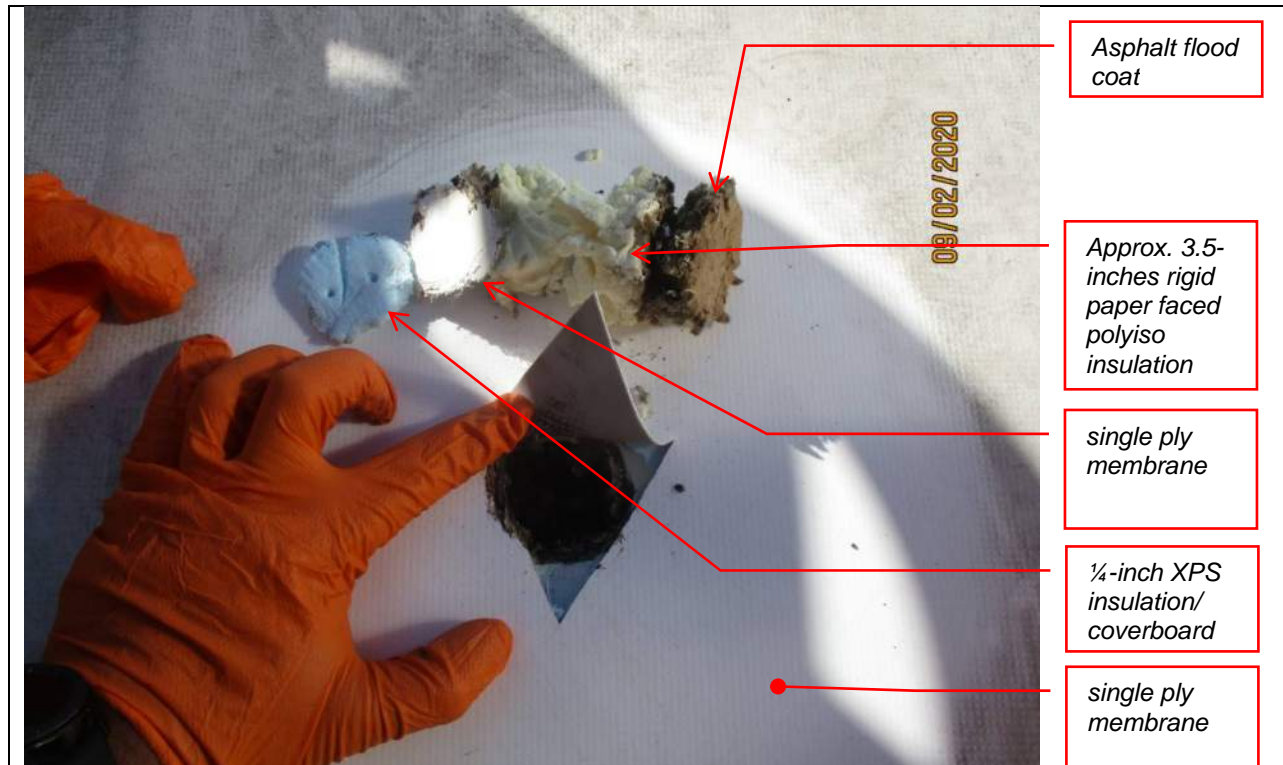


Photograph 49: Tramex RWS moisture meter used to detect an elevated moisture content level on a relative scale next to rooftop cell site equipment.



Photograph 50: Location of roof core, just west of the rooftop cell site equipment where elevated moisture readings were also detected.





Photograph 51: Roof core cut with roofing components removed from core, labeled.







Photograph 53: Close up of polyiso insulation facer removed from core exhibiting some dampness.



Photograph 54: Core cut patches with an under-over butyl roof tape patch over a cleaned membrane surface. Core cut location should be permanently patched with hot-air welded membrane.



Photograph 55: Pan flashing over curb where cell site equipment is located.



Photograph 56: Close up of previous photograph showing hole in pan flashing from removed/relocated fastener.



Photograph 57: Context view of duct work near middle of main roof.



Photograph 58: PVC penetrations flashed with pourable sealant filled clad-metal pockets. Note staining on membrane from apparent leaking at PVC coupler.





*Photograph 59: Sumped sealant within clad-metal pocket at duct support penetration that will hold water if not filled.*



*Photograph 60: Pourable sealant craze cracking and starting to separate at the edges from the clad-metal pocket.*



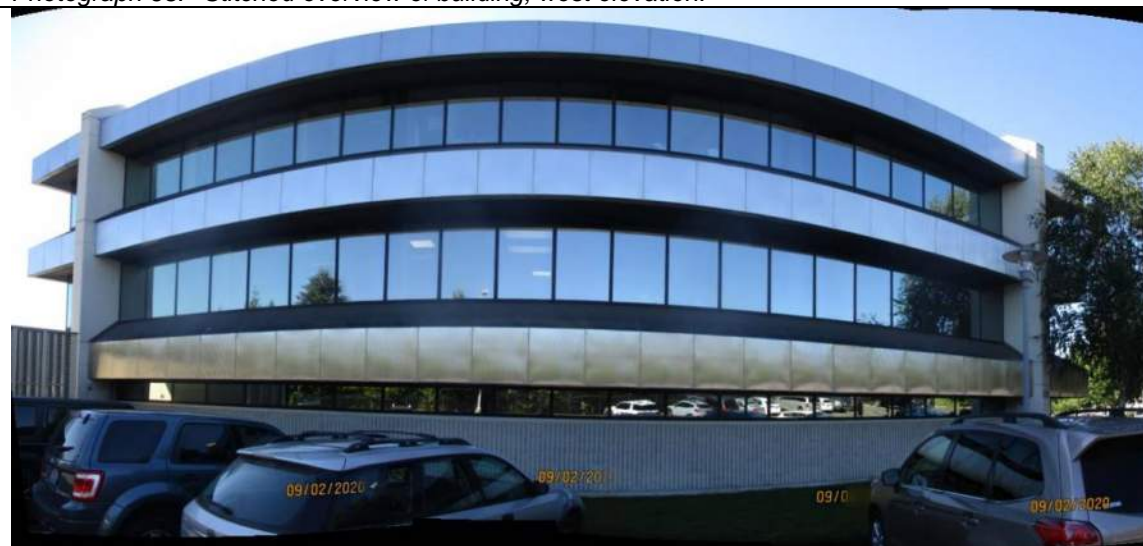
*Photograph 61: Isolator springs anchored through sleeper caps. Penetrations through cap are reliant on regular monitoring and maintenance of sealant to prevent water intrusion.*



Photograph 62: Sealant dependent joints in sheet metal flashing around duct penetration and at miter.



Photograph 63: Stitched overview of building, west elevation.



Photograph 64: Panoramic overview, north elevation.





Photograph 65: Panoramic overview, north and east elevations.



Photograph 66: Panoramic overview, south and east elevation.



Photograph 67: Fluted CMU base at building corner between cast-in-place walls. Aluminum framed strip windows and metal panel structure above.



Photograph 68: Surface mounted counterflashing where metal structure meets cast-in place wall.



Photograph 69: Sealant dependent junction where surface mounted counterflashing interfaces with window frame and along bottom of window.





Photograph 70: Same condition as previous photograph showing additional sealant applied likely in response to water intrusion.



Photograph 71: Failing sealant joint between cast-in-place wall and window frame that needs replacement.



Photograph 72: Failing sealant joint between cast-in-place wall and window frame that needs replacement



Photograph 73: Surface mounted counterflashing transition down front face of metal panel structure.



Photograph 74: Failing sealant joint (arrow) and backing out fastener at surface mounted counterflashing that returns down the front of the metal panel structure.



Photograph 75: Looking up at metal structures interfacing with the cast-in-place concrete walls. Note weep holes along bottom edge.



Photograph 76: Close up view of weep holes in bottom edge of metal soffits.



Photograph 77: Context view of metal clad structure with strip window above.



Photograph 78: Recessed or failing sealant along bottom of windows that may require replacement.





Photograph 79: Window sill condition above fluted CMU elevation.



Photograph 80: Weep in window frame at sill blocked with debris. Weep holes should be regularly cleaned out.



Photograph 81: Landscaping mounded above the interior floor line around most of the building perimeter. Review of any waterproofing components on the wall behind the landscaping could not be visually confirmed without excavation.

**-End of Report-**

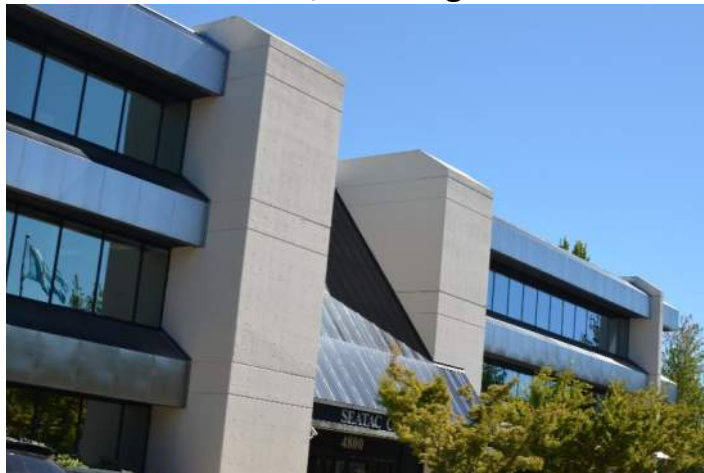
## *APPENDIX H*



## Limited Hazardous Building Material Survey

### SeaTac City Hall

**4800 South 188<sup>th</sup> Street  
SeaTac, Washington**



**EHSI Project No. 11420**

Prepared for:  
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December 2020

- Environmental Consulting
- Hazardous Materials Management
- Industrial Hygiene Services
- Construction Management
- Indoor Air Quality



## EXECUTIVE SUMMARY

ARC Architects (ARC) has contracted EHS-International, Inc. (EHSI), a hazardous materials and industrial hygiene consulting firm, to conduct a Limited Hazardous Materials Survey of the SeaTac City Hall building located at 4800 South 188<sup>th</sup> Street, SeaTac, Washington (Site). EHSI understands that the survey will be used in project planning for upcoming renovation of the Site.

The limited hazardous materials survey included asbestos-containing materials (ACM); lead-containing paint (LCP); polychlorinated biphenyl (PCB)-containing light ballasts; mercury-containing fluorescent light tubes, switches, and thermostats; and other regulated materials. This survey was performed in accordance with federal, state, and local regulatory requirements. Each regulated material included in the survey is summarized below.

### Previous Reports

As part of our asbestos survey methodology, EHSI reviews any previous reports or abatement records available for the Site. EHSI was provided with two ACM reports for this Site. A document, *Asbestos Survey*, prepared by Northwest Abatement Services; Inc. dated November 11, 2016 was written as a comprehensive building survey. Forty-six bulk asbestos samples were collected during that survey and no ACMs were found. Samples were collected from various types of vinyl floor tile and mastic, gypsum wallboard, and ceiling tiles. Another survey *Project Specific Pre Demolition Asbestos Inspection, City of SeaTac City Hall, 4800 South 188<sup>th</sup> Street, SeaTac, WA 98188-8605* prepared by NOW Environmental Services; Inc. dated June 24, 2010 was labelled as a project-specific survey for the roof renovation. Four bulk samples were collected of the existing built-up roofing and no ACMs were detected in these samples.

### Asbestos-Containing Building Materials

EHSI collected two hundred seventy-six (276) bulk samples of suspect ACM at the Site. Additionally, twelve (12) split bulk samples were sent to a second laboratory for quality assurance purposes. Of the two hundred seventy-six (276) bulk samples, laboratory analyses revealed twelve (12) bulk samples from nine (9) homogenous materials contained greater than one percent asbestos. Several of the materials that do not contain asbestos are adhered to ACM and must also be assumed to be contaminated with asbestos in the event those materials are removed or disturbed during demolition. Specific sample locations of the suspect materials can be referenced in sample location figures SL-1 through SL-5.

The following ACMs or assumed ACMs were identified at the Site described below by area.

- **50 SF – Brown mastic\*** under 1'x1' vinyl composite tile with fibrous backing (multi-colored) over yellow mastic on concrete in the lunchroom on the first floor.
- **50 SF – Black and yellow mastic\*** under carpet in the hallway outside the secure area.
- **6 each (EA) – Yellow mastic** on wall with blue fibrous wall panels 2'x4'.
- **500 SF – Yellow mastic\*** on concrete floor under carpet in the Human Resources area on the second floor, which is under construction.
- **200 SF – Vinyl composition tile and black mastic\*** on concrete in the Human Resources area under construction.

- **150 SF – Black mastic on concrete\*** under 2 layers of non-acm vinyl floor tile, 1'x1' gray vinyl floor tile and yellow mastic and 1'x1' gray vinyl floor tile.
- **75 SF – Flexible joint (white)** on air handling unit on roof.
- **75 SF – Flexible joint (black)** on air handling unit on roof.
- **50 SF – Red mastic** on air handling unit on roof.

#### Assumed ACMs

- **Electrical equipment** with assumed ACM internal components located throughout the building. Electrical equipment and wiring were energized, and thus were not sampled.

\*Several of the ACMs have estimated quantities and should be assumed to be in more locations than found by our survey because they are covered by other flooring layers including carpet or other floor tiles.

#### Assumed ACMs

- **Electrical equipment** with assumed ACM internal components located throughout the building. Electrical equipment and wiring were energized, and thus was not sampled.

#### Lead-Containing Paint

EHSI completed a limited lead assessment of the building through the collection and analysis of four (4) paint chip samples. Lead was not detected in the paint chip samples analyzed as a part of the limited hazardous building material survey. Because EHSI's survey was limited and did not include a comprehensive paint color and substrate survey, EHSI recommends if painted coatings within the building contain at least detectable levels of lead.

The OSHA Lead in Construction Standard applies to construction-related tasks that impact any detectable level of lead. During renovation or demolition activities, we recommend that the contractor use precautions and follow health and safety guidelines, since all painted surfaces within the project area are considered to contain detectable levels of lead. EHSI recommends that the provided paint chip sample results be used in conjunction with other applicable (e.g., air monitoring) data to evaluate the potential for elevated occupation lead exposures during demolition activities.

#### Polychlorinated Biphenyl Light Ballasts, Mercury, and Other Regulated Materials

As part of our survey for regulated materials, EHSI quantified the number of light ballasts and prepared an inventory of other installed regulated materials that may classify as universal hazardous wastes or other regulated wastes. These materials included mercury-containing items such as fluorescent light tubes, high-intensity discharge lighting, thermostats, and switches. Other regulated materials included CFC-containing items, and possible tritium-containing exit signs. All identified magnetic ballasts are assumed to contain PCBs. A similar assumption applies to mercury potentially present within fluorescent lamps and fluorescent light fixtures. Generally, it is not necessary to sample these materials because their presence within the building represents a future cost for disposal of the facility's installed contents.

The following regulated materials were identified at the Site described below by building or area.

- Potential mercury-containing fluorescent light tubes: 1,164 each (EA)
- Potential PCB-containing light ballasts: 633 EA
- Refrigerators with assumed CFCs: 6 EA
- Drinking fountains with assumed CFCs: 3 EA
- Exit Signs (non-electronic): 3 EA

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
1.1 SCOPE OF WORK.....	1
1.2 BUILDING DESCRIPTION .....	1
1.3 LIMITATIONS .....	2
<b>2.0 METHODOLOGY .....</b>	<b>2</b>
2.1 ASBESTOS SURVEY METHODOLOGY .....	2
2.1.1 <i>Previous Reports</i> .....	3
2.1.2 <i>Sample Documentation</i> .....	4
2.1.3 <i>Laboratory Analysis</i> .....	4
2.2 LEAD SURVEY .....	4
2.2.1 <i>Sample Documentation</i> .....	4
2.2.2 <i>Laboratory Analysis</i> .....	5
2.3 VISUAL SURVEY OF PCBs, MERCURY, AND OTHER REGULATED MATERIALS .....	5
<b>3.0 RESULTS .....</b>	<b>5</b>
3.1 ASBESTOS .....	5
3.2 LEAD.....	6
3.3 PCBs, MERCURY, AND OTHER REGULATED MATERIALS.....	6
<b>4.0 CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>7</b>
4.1 ASBESTOS-CONTAINING MATERIALS .....	7
4.2 LEAD PAINT.....	7
4.3 PCBs, MERCURY, AND OTHER REGULATED MATERIALS.....	8
4.3.1 <i>Polychlorinated Biphenyl Light Ballasts</i> .....	8
4.3.2 <i>Mercury</i> .....	8
4.3.3 <i>Other Regulated Wastes</i> .....	9

## FIGURES

SL-1, First Floor North  
SL-2, First Floor South  
SL-3, Second Floor  
SL-4, Third Floor  
SL-5, Exterior and Roof

## TABLES

Table 1, Summary of Asbestos Bulk Sampling and Analytical Results  
Table 2, Summary of Lead Bulk Sampling and Analytical Results  
Table 3, Summary of PCB Light Ballasts, Mercury, and other Regulated Materials

## **APPENDICES**

Appendix A, Inspector Certifications

Appendix B, Laboratory Analytical Reports and Chain-of-Custody Forms

Appendix C, Laboratory Certifications

Appendix D, Selected Photographs of Asbestos Containing Materials

## 1.0 INTRODUCTION

ARC Architects (ARC) has contracted EHS-International, Inc. (EHSI), a limited hazardous materials and industrial hygiene consulting firm, to conduct a Limited Hazardous Materials Survey of the SeaTac City Hall building located at 4800 South 188<sup>th</sup> Street in SeaTac, Washington (Site). EHSI understands that the survey will be used in project planning for upcoming renovation of the Site building.

This survey was performed in accordance with federal, state, and local regulatory requirements. Each regulated material included in the limited hazardous material survey is summarized below.

### 1.1 Scope of Work

The scope of services for the limited hazardous materials survey included the following tasks:

- Review and incorporate past asbestos survey information into this survey.
- Collect bulk suspect asbestos-containing materials ACM samples as necessary to identify ACM within the Site building. Where bulk sampling or access is not possible, review available historical drawings and make inventory assumptions to the likely quantities of ACM that can be assumed.
- Collect limited lead-containing paint (LCP) chip samples of common color paints on representative building components and have them analyzed for lead.
- Inventory universal wastes such as potential polychlorinated biphenyl (PCB)-containing lighting ballasts; mercury-containing fluorescent light tubes; high pressure sodium lamps; mercury-containing fluorescent light tubes, switches, and thermostats; fire extinguishers; and various ozone-depleting substances.
- Prepare a summary report documenting the findings of the survey and provide tables summarizing hazardous materials, analytical data, comments and recommendations for handling and control.

### 1.2 Building Description

The Site building was constructed in 1979 and was originally occupied by an insurance company. The City of SeaTac purchased the Site building in 2001 and renovated it into the current configuration used by the City. The Site building has a gross square footage of 81,371 square feet and an effective square footage of 75,363 square feet. The building construction is re-enforced concrete. The Site building is heated using heat pumps. Interior construction consists of concrete floors, metal stud walls covered in gypsum wallboard. Floor finishes are carpet or vinyl floor tile over concrete. Ceilings are predominantly suspended ceiling tiles in offices and other functional spaces and gypsum wallboard in the restrooms. Each floor contains a mechanical room and equipment room in the central portion of the Site building. The roof is flat with a membrane-type covering.



### 1.3 Limitations

The conclusions of the report are professional opinions based solely upon visual site observations, and interpretations of sample analyses as described in this report. The opinions presented herein apply to conditions existing at the time of the investigation, and interpretation of current regulations pertaining to ACMs. Therefore, opinions and recommendations provided herein might not apply to future conditions that may exist at the Site. Current applicable regulations should always be verified prior to any work involving asbestos or other regulated materials. This survey is not intended to be used as an abatement design document. All existing conditions, quantities, and locations should be verified prior to abatement. ACM may be located within areas that were not accessible during this survey. The survey did not include an investigation of potentially buried piping within or in the vicinity of the structures.

The purpose of the limited hazardous material survey is to reasonably test for evidence of asbestos and other hazardous materials in suspect or randomly selected materials at a facility. It should be noted that no survey can be comprehensive or exhaustive enough to eliminate the possibility that ACM present at the Site may not be detected during the survey. Therefore, the completion of this or any survey for ACM or other hazardous materials should not be considered a warranty or guarantee that these materials do not exist, even if they are not detected through a survey.

The survey did not include sampling of the following materials or locations at the Site due to limited access:

- Flat roof
- Materials associated with energized electrical equipment (e.g. wiring and panel boards) and transformers
- Buried piping
- Gaskets or packing materials in closed equipment

Due to the age of the building on the Site, it is possible that materials associated with the above-noted structures/systems may be asbestos-containing. If suspect materials are determined to be present within the above-noted systems, the materials should be considered as presumed ACMs until proven otherwise by sampling and laboratory analysis.

## 2.0 METHODOLOGY

Information concerning the Site was obtained from site inspections conducted by EHSI employees including Mr. Joel Whelchel and Mr. Sunny Joshi. Copies of their AHERA building inspector certifications are included in Appendix A. This section describes the sampling methodology and applicable asbestos regulations.

### 2.1 Asbestos Survey Methodology

A visual inspection of accessible areas was conducted to identify suspect ACM and assumed ACM. The asbestos survey was performed by AHERA-certified building inspectors in accordance with a sampling protocol appropriate for the demolition of the Site building. The sampling protocol was developed in accordance with the following:

- U. S. Environmental Protection Agency (EPA) Asbestos Regulation within the Toxic Substances Control Act (40 Code of Federal Regulation [CFR] 763)
- Puget Sound Clean Air Agency (PSCAA) Asbestos Control Standards (Regulation III, Article 4), and
- Washington State Department of Labor and Industries Asbestos, Tremolite, Anthophyllite, and Actinolite Regulation (WAC 296-62-077).

The sampling plan included, at a minimum, the collection and analysis of samples as follows:

- Thermal system insulation (TSI): EHSI collected a minimum of three samples in a distributive manner from each homogeneous sampling area not presumed to contain asbestos. At least one bulk sample of patched TSI was collected from each homogenous area, if the patch was less than 6 square feet in area.
- Surfacing material: EHSI collected a minimum of three samples in a distributive manner from each homogenous area that was 1,000 square feet or less in area. A minimum of five samples were collected from each homogenous area that was more than 1,000 square feet but less than or equal to 5,000 square feet in area. A minimum of seven samples were collected from each homogenous area that was more than 5,000 square feet in area.
- Miscellaneous material: EHSI collected bulk samples of suspect ACM in a distributive manner as deemed sufficient by the AHERA-certified building inspector. At least one sample was collected of each suspect miscellaneous material not presumed to contain asbestos.
- Non-suspect materials: According to 40 CFR 763-86(4), where the accredited inspector has deemed the material to be fiberglass, foam glass, rubber, or other recognized non-ACM, sampling is not required.

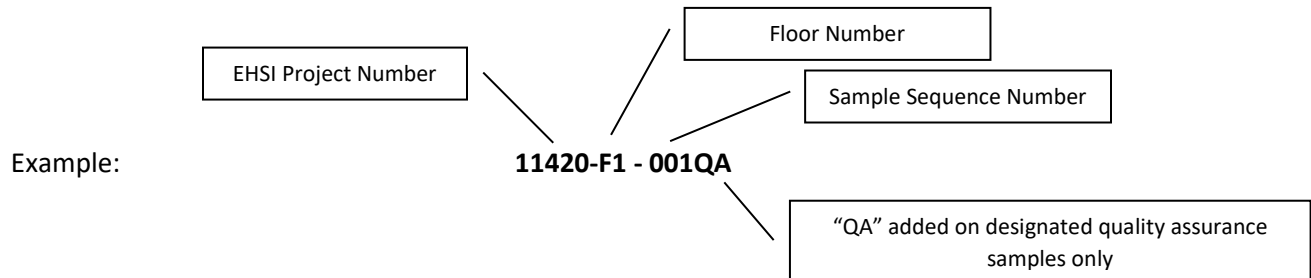
EHSI collected two-hundred and seventy-six (276) bulk samples of suspect ACM. Samples were collected by carefully removing small portions of the suspect material with a sharp knife or other hand tool suitable for the material being sampled. The sampling instrument was wiped with a clean moist cloth to decontaminate the tool and minimize the potential release of asbestos fibers or cross-contamination of subsequent samples. Once collected, each bulk sample was sealed in a new clean plastic bag to eliminate the possibility of cross-contamination, labeled with the sample name, and shipped to the analytical laboratory under standard chain-of-custody protocols. Bulk ACM sample locations are illustrated in Figures SL-1 through SL-5.

### 2.1.1 Previous Reports

As part of our asbestos survey methodology, EHSI reviews any previous reports or abatement records available for the Site. EHSI was provided with two ACM reports for this Site. A document, *Asbestos Survey*, prepared by Northwest Abatement Services; Inc. dated November 11, 2016 was written as a comprehensive building survey. Forty-six bulk asbestos samples were collected during that survey and no ACMs were found. Samples were collected from various types of vinyl floor tile and mastic, gypsum wallboard, and ceiling tiles. Another survey *Project Specific Pre Demolition Asbestos Inspection, City of SeaTac City Hall, 4800 South 188<sup>th</sup> Street, SeaTac, WA 98188-8605* prepared by NOW Environmental Services; Inc. dated June 24, 2010 was labelled as a project-specific survey for the roof renovation. Four bulk samples were collected of the existing built-up roofing and no ACMs were detected in these samples. Based on these previous reports, EHSI determined that we would not collect samples of the newer roofing since the previous reports sampled the original roof and did not find asbestos.

### 2.1.2 Sample Documentation

A unique sample identification system was employed for bulk samples of suspect ACMs collected during the survey that includes the project number, and sample sequence number.



Data pertinent to each sample (e.g., date, sample name, material description, and material category) was recorded on a field data sheet. The material determination of friability was made by the AHERA-certified building inspector in the field. Details regarding the bulk samples of suspect ACMs and their friability are summarized in Table 1.

### 2.1.3 Laboratory Analysis

As specified in 40 CFR 763.87, each sample was analyzed using polarized light microscopy (PLM) with dispersion staining in accordance with EPA Method 600/R-93/116. Samples were analyzed for asbestos content by NVL Laboratories, Inc. (NVL) in Seattle, Washington. NVL participates in the National Institute for Standards and Technology National Voluntary Laboratory Accreditation Plan (NVLAP). Only materials containing greater than 1% total asbestos were classified as "asbestos-containing" based on EPA, state, and local regulations.

Split samples were collected from some same locations for the purposes of quality assurance (QA) and sent to a separate laboratory for analysis. QA samples were submitted to Seattle Asbestos Test, LLC (SAT) in Seattle, Washington. SAT is also a NVLAP-accredited laboratory.

Laboratory analytical reports and chain-of-custody forms are provided in Appendix B. Laboratory certifications are provided in Appendix C.

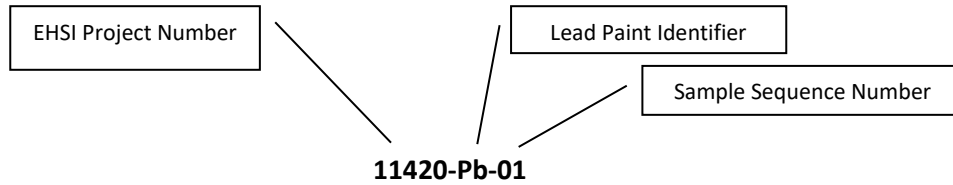
## 2.2 Lead Survey

The lead survey consisted of EHSI collecting a minimal number of representative suspect paint chip samples. EHSI collected four (4) paint chip samples during the limited hazardous building material survey. Paint chip samples were obtained by carefully scraping the paint layers away from the substrate with a stainless-steel knife blade. Approximately 1 square inch of paint coating was removed for each sample. Samples were then placed into 2-ounce, puncture-proof, polyethylene bags, labeled with sample name, and placed in a box for shipping to the analytical laboratory under standard chain-of-custody protocols. The sampling blade was cleaned to reduce the possibility of cross-contamination between sample locations.

### 2.2.1 Sample Documentation

A unique sample identification system was employed for paint chip samples that included the project number, chemical abbreviation for lead, and sample sequence number.

Example:



### 2.2.2 Laboratory Analysis

The paint chip samples were analyzed in accordance with EPA Method 3051/7000B by NVL. NVL participates in the National Environmental Laboratory Accreditation Program and employs American Industrial Hygiene Association quality control procedures.

Laboratory analytical reports and chain-of-custody forms are provided in Appendix B. Laboratory certifications are provided in Appendix C.

## 2.3 Visual Survey of PCBs, Mercury, and Other Regulated Materials

Verifying the presence or absence of PCBs, mercury, or other regulated materials by laboratory analysis, was beyond the scope of this survey. The survey did include visual identification and determination of quantities of potentially PCB-containing fluorescent light ballasts or transformers. All the ballasts and transformers were assumed to contain PCBs. A similar assumption applies to mercury potentially present within fluorescent lamps in fluorescent light fixtures, High Intensity Discharge (HID) lamps, thermometers, thermostats, mercury switches, exit signs (tritium), and chlorofluorocarbon (CFC)-containing items (if observed).

## 3.0 RESULTS

This section summarizes the results of the limited hazardous building material survey conducted at the Site.

### 3.1 Asbestos

The following ACMs or assumed ACMs were identified at the Site, described below. All quantities are approximate.

- **50 SF – Brown mastic\*** under 1'x1' vinyl composite tile with fibrous backing (multi-colored) over yellow mastic on concrete in the lunchroom on the first floor.
- **50 SF – Black and yellow mastic\*** under carpet in the hallway outside the secure area.
- **6 each (EA) – Yellow mastic** on blue fibrous wall panels 2'x4'.
- **500 SF – Yellow mastic\*** on concrete floor under carpet in the Human Resources area on the second floor, which is under construction.
- **200 SF – Vinyl composition tile and black mastic\*** on concrete in the Human Resources area under construction.
- **150 SF – Black mastic on concrete\*** under 2 layers of non-acm vinyl floor tile, 1'x1' gray vinyl floor tile and yellow mastic and 1'x1' gray vinyl floor tile.
- **75 SF – Flexible joint (white)** on air handling unit on roof.

- **75 SF – Flexible joint (black)** on air handling unit on roof.
- **50 SF – Red mastic** on air handling unit on roof.

#### Assumed ACMs

- **Electrical equipment** with assumed ACM internal components located throughout the building. Electrical equipment and wiring were energized, and thus were not sampled.

\*Several of the ACMs have estimated quantities and should be assumed to be in more locations than found by our survey because they are covered by other flooring layers including carpet or other floor tiles.

A detailed summary of ACMs including the sample number, homogenous material description, material classification, analytical results, and quantity (for ACMs only) is provided in Table 1. Copies of the analytical laboratory reports and chain-of-custody forms for bulk samples of suspect ACM are included in Appendix B. Select photographs of ACMs are provided in Appendix D. Bulk suspect ACM sample locations are illustrated on Figures SL-1 through SL-5.

### 3.2 Lead

The Washington State Department of Commerce defines LCP as coatings with a concentration of lead greater than or equal to 0.5 percent by weight. However, the U.S. Department of Labor and the Washington State Department of Labor and Industries require that the Washington State Construction Standards for Lead (WAC 296-155-176) be followed during “new construction, alteration, repair, or renovation of structures, substrates, or portions thereof that contain lead, or materials containing lead.” These standards consider *any detectable* concentration of lead to be a potential hazard during construction activities.

EHSI collected four (4) paint chip samples from the Site. All of the paint chip samples were identified as being below the limit of detection for lead. The paint chip analytical results are included in Table 2. Even though the five samples collected were below the limit of detection, EHSI recommends treating all painted surfaces as having paint with detectable concentrations of lead. A comprehensive analysis of all potential painted surfaces and substrate color combinations was beyond the scope of work for this survey.

A copy of the laboratory analytical report and chain-of-custody form for paint chip samples are included in Appendix B.

### 3.3 PCBs, Mercury, and Other Regulated Materials

A tabulated summary of fluorescent light ballasts, mercury-containing light tubes, HID lamps, compact fluorescent light bulbs, switches, and thermostats, and CFC-containing materials are provided in Table 3.

#### Conclusions and Recommendations

A copy of this report must be provided to any contractor bidding and/or conducting work at the Site. The contractor must also have a copy of this report during renovation or demolition activities at the Site. Conclusions and recommendations for each regulated material category are summarized below.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

A copy of this report must be provided to any contractor bidding and/or conducting work at the Site. The contractor must also have a copy of this report during renovation or demolition activities at the Site. Conclusions and recommendations for each regulated material category are summarized below.

### 4.1 Asbestos-Containing Materials

ACMs were identified at the SeaTac City Hall building. An asbestos abatement contractor licensed in accordance with WAC 296-62-077 and PSCAA Regulation III, Article 4 must remove all asbestos-containing and asbestos contaminated building materials prior to disturbance.

The contractor should also use caution when performing renovation or demolition activities within the project areas even after asbestos abatement activities have been conducted. Concealed materials may be encountered during a renovation or demolition project. ACM may be located between walls, in pipe chases, between pipe flanges or other inaccessible areas.

If additional suspect building materials not identified specifically in this report as either ACM or non-ACM are identified during demolition activities, they should be treated as ACM until sampled by an AHERA-certified building inspector and proven to not contain asbestos through laboratory analysis.

If the City of SeaTac is not planning a renovation or demolition of the Site building, EHSI recommends developing an asbestos operations and maintenance (O&M) plan for the ACMs in the Site building. An O&M program is a formulated plan for training, cleaning, work practices, and surveillance to maintain ACM so that it is maintained in good condition within buildings. The objective of an O&M program is to minimize exposure of building occupants to asbestos fibers. This information is primarily for the use of owners, building managers, maintenance workers, and other key building staff so that the ACM can be managed in place and not require control and abatement procedures that are outside the scope of an O&M program.

### 4.2 Lead Paint

The Washington State Department of Labor and Industries considers any detectable concentration of lead to be a potential hazard during construction activities. Based on the limited testing of painted surfaces completed by EHSI, EHSI recommends assuming all painted surfaces in the project area contain at least detectable levels of lead. Most of the paint coatings were found to be in good condition. EHSI recommends that the contractor use precautions and follow applicable health and safety guidelines when removing materials during asbestos abatement activities, building renovation, or demolition.

For work on building components containing lead or other heavy metals, which may result in personnel exposures, the contractor must assess the hazard. Based on the assessment, and previous similar work and exposure monitoring results, the contractor may have to provide any or all the following for employees per WAC 296-155-176:

- Respiratory protection.
- Protective clothing.
- Clean change areas.
- Clean handwashing facilities.



- Biological monitoring to consist of blood sampling and analysis for lead and zinc protoporphyrin levels; and
- Hazard communication training.

Initial employee exposure monitoring must be conducted for each separate task involving the handling of LCP-coated building materials. If 8-hour time-weighted average exposures exceed the action level of 30 micrograms per cubic meter, the contractor must continue to conduct periodic air monitoring at specified intervals, and institute medical surveillance and comprehensive training programs. If the OSHA 8-hour time-weighted average permissible exposure limit of 50 micrograms per cubic meter of lead is exceeded, more stringent and additional requirements become effective, such as engineering controls, respiratory protection, regulated work areas and warning signs in lead work areas.

The general contractor performing renovation or demolition work should be informed of the presence of lead in the project area. All personnel impacting LCP (or other lead-containing materials) should be provided additional training concerning the health effects of lead, proper work methods, appropriate use of personal protective equipment, and regulations governing lead exposures. Air monitoring to assess lead exposures should be performed for all personnel involved in the demolition process where LCP may be removed.

### **4.3 PCBs, Mercury, and Other Regulated Materials**

#### **4.3.1 Polychlorinated Biphenyl Light Ballasts**

The Washington State Dangerous Waste Regulation, WAC 173-303, designates that discarded transformers, capacitors, or bushings containing PCBs at concentrations of 2 parts per million or greater be treated as a PCB-containing material. Light ballasts fall under this regulation. Previous regulations dictated that any material with less than 50 parts per million of PCBs could be labeled as a non-PCB-containing material. Because of this regulatory change, EHSI recommends that all light ballasts be tracked, removed, handled, and disposed of in an appropriate manner. Ballasts with a label stating “NO PCB” (or something similar) shall be packaged for recycling by an approved recycling facility.

#### **4.3.2 Mercury**

Many fluorescent light tubes, HID lamps, thermostats, and switches contain mercury that is harmful to the environment and human health. The EPA and Washington State Department of Ecology have placed these materials in a special category of dangerous waste known as universal waste. Some of the requirements included within the Standards for Universal Waste Management (WAC 173-303-573) include:

- Immediately place lamps showing evidence of leakage, damage, etc. into a container following removal.
- Containerize in closed, structurally sound, compatible containers. Cardboard containers may be used for inside storage only.
- Labeling container as follows: “Waste Lamps,” or “Universal Waste Lamps”.
- Track the length of time since waste lamp generation. Acceptable methods of proof include date on label, inventory system, etc.
- Respond immediately to potential releases. If determined to be a release, contain, and determine if it designates as a dangerous waste.
- Disposal of universal waste as general or construction debris is not permitted.

- The crushing of fluorescent light tubes on-site is not allowed. In addition, measures should be taken to prevent breakage of fluorescent light tubes while the light tubes are in transit to their destination.
- Provide training to employees on the proper handling and emergency procedures for universal waste lamps.
- Track shipments of universal waste lamps with records (invoice, manifest, etc.) kept for a minimum of 3 years.

#### *4.3.3 Other Regulated Wastes*

The following “other regulated waste” categories have differing requirements depending on whether they will be recycled or disposed. The following descriptions are separated by the category of regulated materials as described throughout this report. The identified regulated materials should be properly removed and handled before demolition activities begin in the building. A removal plan should be developed that includes worker training and protection, identification and removal procedures, storage, transport, and disposal procedures. The following sections generally provide appropriate disposal options for the identified materials.

##### *4.3.3.1 Chlorofluorocarbons*

Installed items containing CFCs, such as refrigerators and heat pumps, should be removed from the facility prior to demolition. Items containing CFCs are not allowed to be disposed of as solid waste. EHSI recommends recycling CFC-containing items at an approved facility to help ensure that CFCs and other refrigerants are properly removed from the item prior to disposal. Refrigerants should be reclaimed and recycled by a qualified CFC reclamation contractor prior to disturbance.

# Figures

GENERAL NOTES

- 1. DRAWING IS SCHEMATIC AND SAMPLE LOCATIONS ARE APPROXIMATE.
- 2. REFER TO REPORT FOR MORE INFORMATION ABOUT THE SAMPLED MATERIALS.

SAMPLE LEGEND

11420-F1-XX

BULK ASBESTOS SAMPLE LOCATIONS

SAMPLE NUMBER

FLOOR NUMBER

EHSI JOB NUMBER

XX↑ SAMPLE TAKEN ABOVE CEILING

ehsi

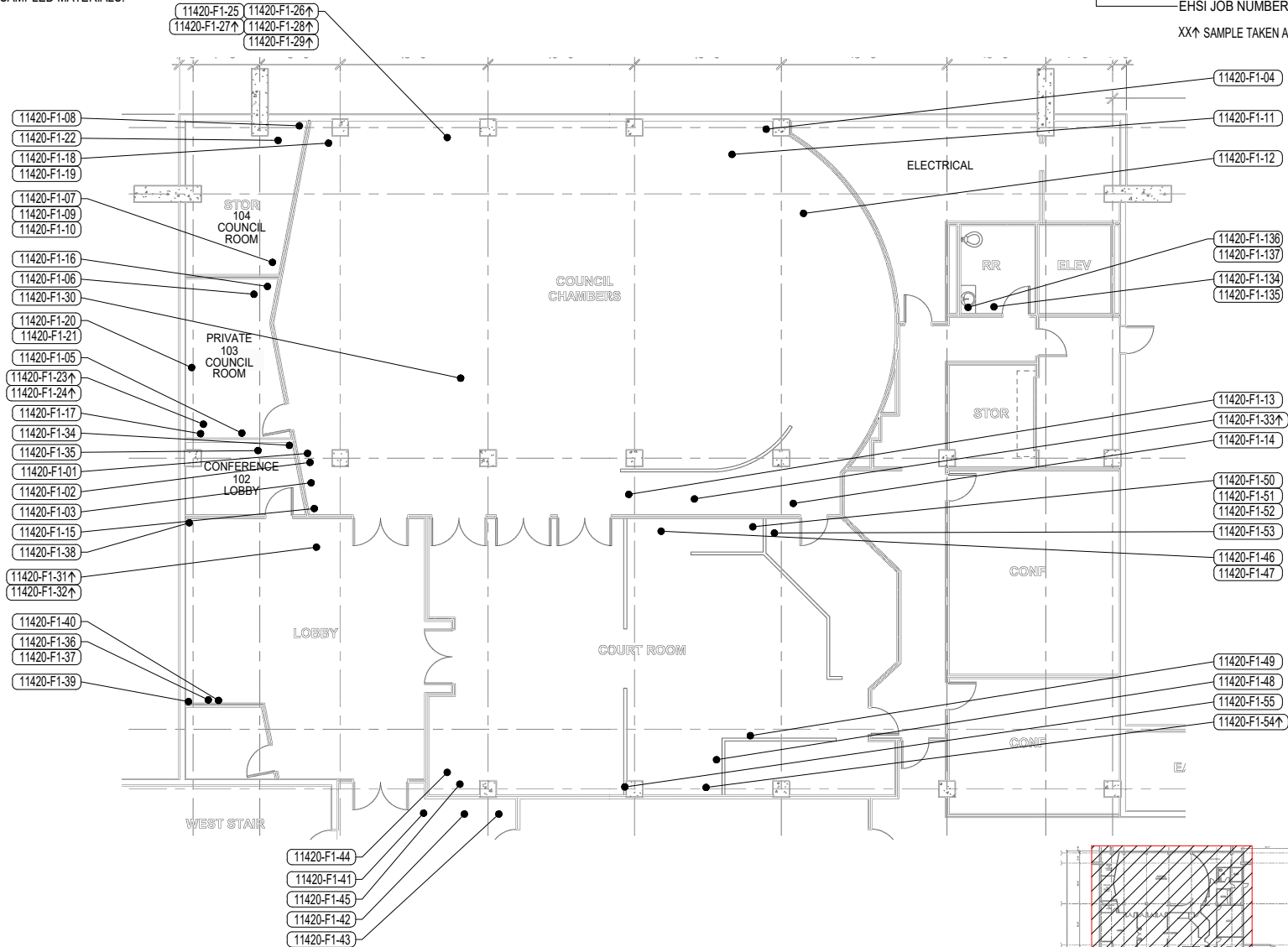
A Subsidiary of SwannEarth Strategies

1011 SW Klickitat Way, Suite 104

Seattle, Washington 98134

Ph: 206.381.1128

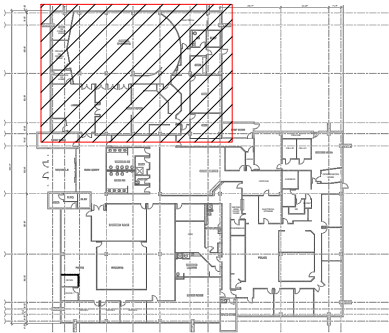
Fax: 206.254.4279



FIRST FLOOR NORTH

NOT TO SCALE

PROJECT NORTH



KEY PLAN

NOT TO SCALE

PROJECT NORTH

SEATAC CITY HALL BUILDING  
4800 SOUTH 188TH STREET  
SEATAC, WA

ARC ARCHITECTS  
SEATTLE, WA

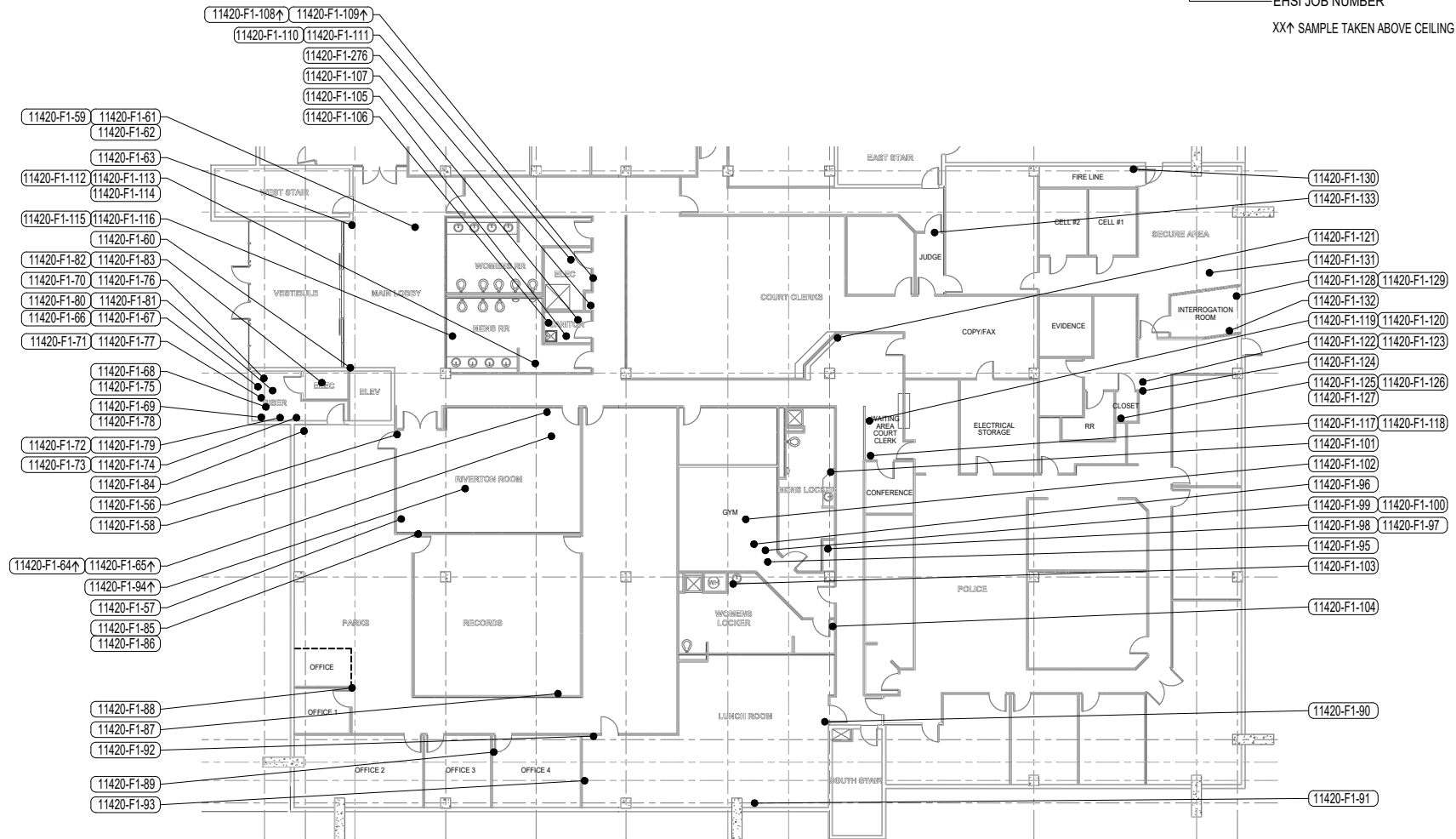
PROJECT MANAGER:	D BRAUNGARDT
INSPECTORS:	J WHELCHER S JOSHI
SURVEY DATES:	09/24/20-09/25/20 09/28/20-09/30-20
EHSI PROJECT #:	11420-01
DRAWN BY:	DIMALANTA
SCALE:	NTS
ISSUE DATE:	10/15/20

FIRST FLOOR  
NORTH

SL-1

GENERAL NOTES

- 1. DRAWING IS SCHEMATIC AND SAMPLE LOCATIONS ARE APPROXIMATE.
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FIRST FLOOR SOUTH

NOT TO SCALE



SAMPLE LEGEND

- 11420-F1-XX BULK ASBESTOS SAMPLE LOCATIONS
- 11420-F1-XX SAMPLE NUMBER
- 11420-F1-XX FLOOR NUMBER
- 11420-F1-XX EHSI JOB NUMBER
- XX↑ SAMPLE TAKEN ABOVE CEILING

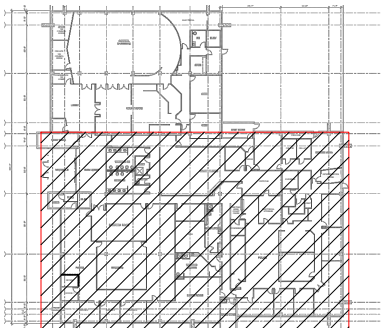
**ehsi**  
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SEATAC CITY HALL BUILDING  
4800 SOUTH 188TH STREET  
SEATAC, WA  
ARC ARCHITECTS  
SEATTLE, WA

PROJECT MANAGER:	D BRAUNGARDT
INSPECTORS:	J WHELCHER S JOSHI
SURVEY DATES:	09/24/20-09/25/20 09/28/20-09/30-20
EHSI PROJECT #:	11420-01
DRAWN BY:	DIMALANTA
SCALE:	NTS
ISSUE DATE:	10/15/20

FIRST FLOOR SOUTH

SL-2



KEY PLAN

NOT TO SCALE



GENERAL NOTES

- 1. DRAWING IS SCHEMATIC AND SAMPLE LOCATIONS ARE APPROXIMATE.
- 2. REFER TO REPORT FOR MORE INFORMATION ABOUT THE SAMPLED MATERIALS.

SAMPLE LEGEND

11420-F2-XX

BULK ASBESTOS SAMPLE LOCATIONS

SAMPLE NUMBER

FLOOR NUMBER

EHSI JOB NUMBER

ehsi

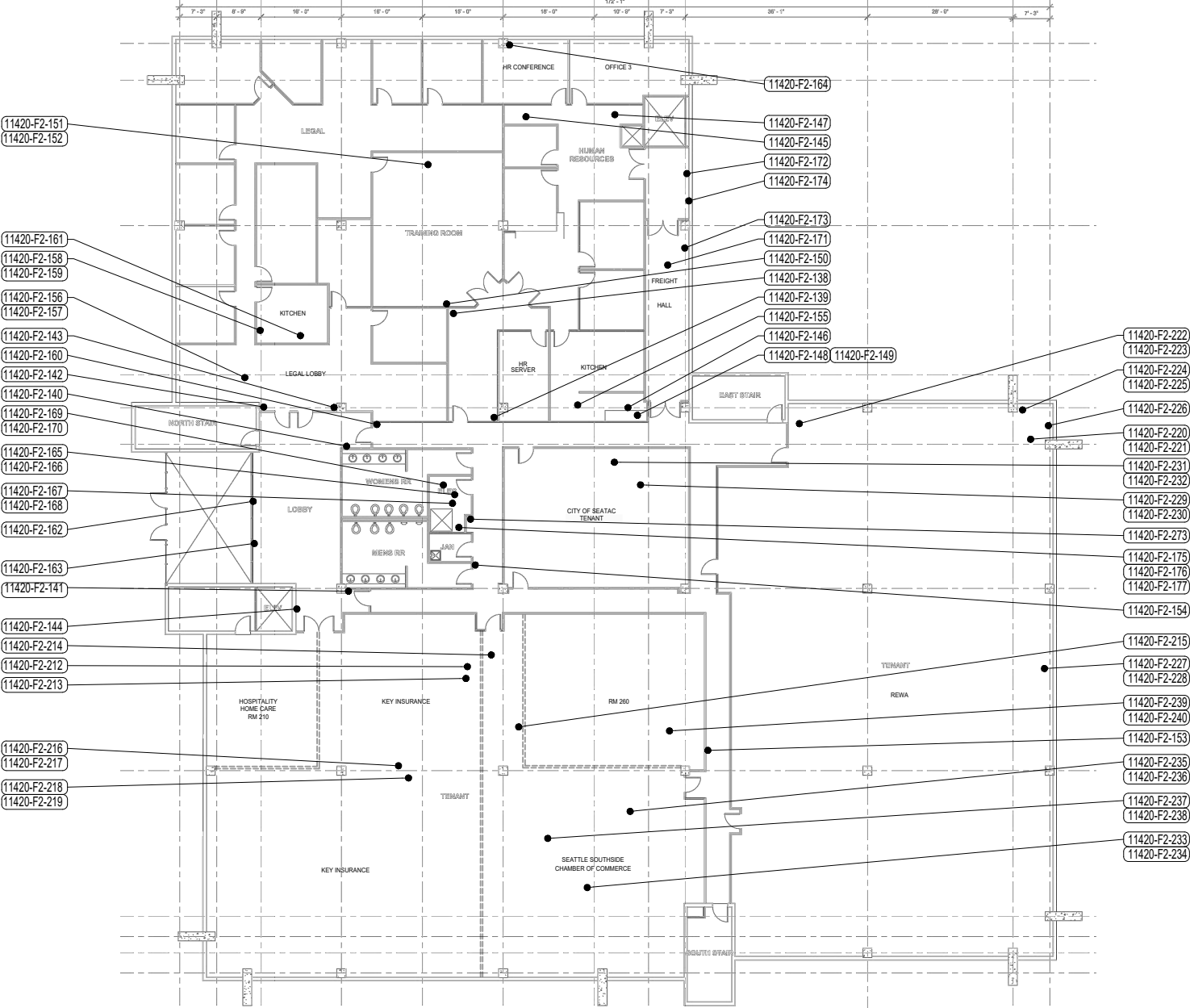
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Seattle, Washington 98134

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SECOND FLOOR

NOT TO SCALE



SEATAC CITY HALL BUILDING  
4800 SOUTH 188TH STREET  
SEATAC, WA  
ARC ARCHITECTS  
SEATTLE, WA

PROJECT MANAGER:	D BRAUNGARDT
INSPECTORS:	J WHELCHER S JOSHI
SURVEY DATES:	09/24/20-09/25/20 09/28/20-09/30-20
EHSI PROJECT #	11420-01
DRAWN BY:	DIMALANTA
SCALE:	NTS
ISSUE DATE:	10/15/20

SECOND FLOOR

SL-3



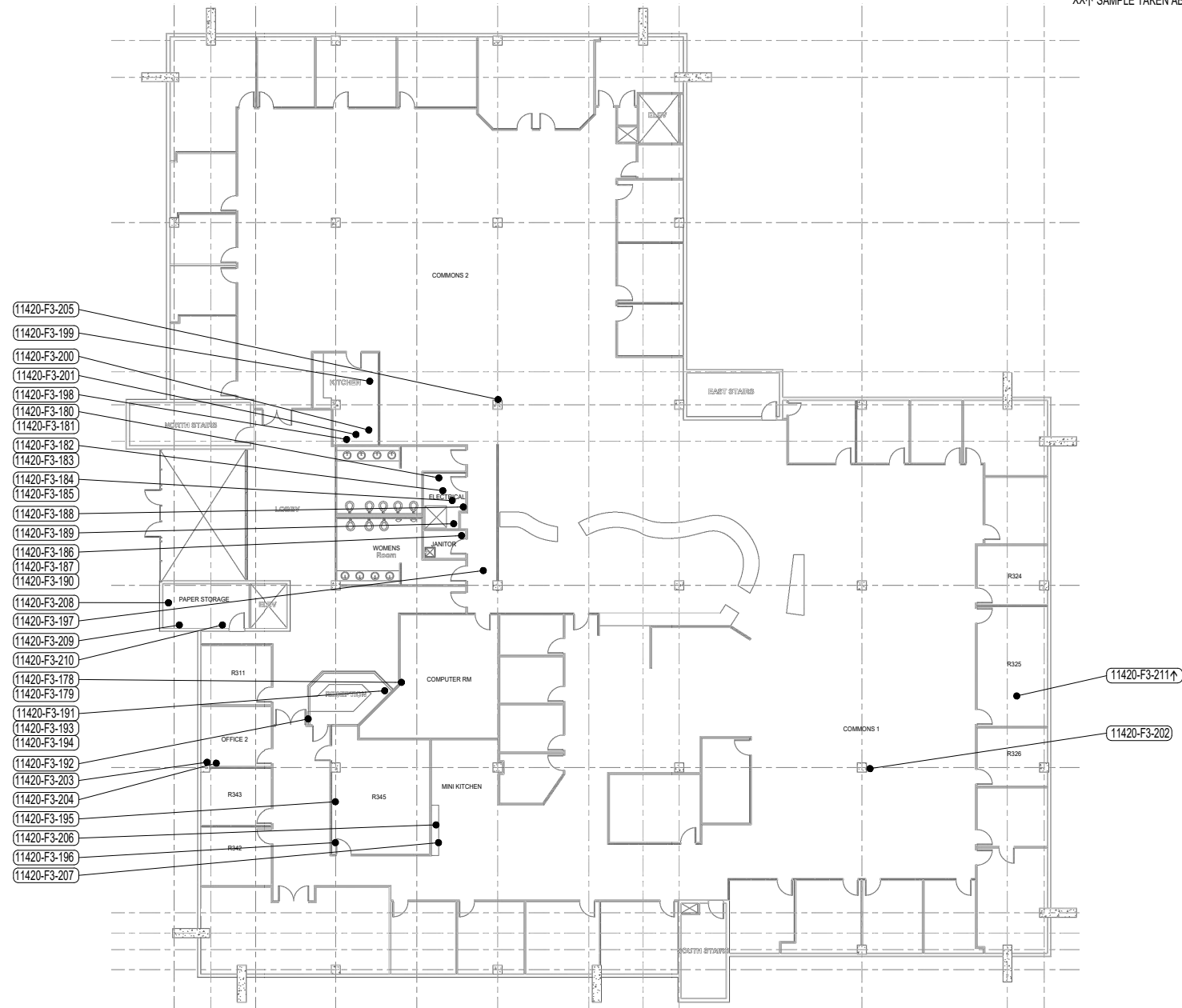
## GENERAL NOTES

1. DRAWING IS SCHEMATIC AND SAMPLE LOCATIONS ARE APPROXIMATE.
2. REFER TO REPORT FOR MORE INFORMATION ABOUT THE SAMPLED MATERIALS.

## SAMPLE LEGEND

11420-F3-XX	BULK ASBESTOS SAMPLE LOCATIONS
11420-F3-XX	SAMPLE NUMBER
11420-F3-XX	FLOOR NUMBER
11420-F3-XX	EHSI JOB NUMBER
XX↑	SAMPLE TAKEN ABOVE CEILING

**ehsi**  
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THIRD FLOOR

NOT TO SCALE



SEATAC CITY HALL BUILDING  
4800 SOUTH 188TH STREET  
SEATAC, WA  
ARC ARCHITECTS  
SEATTLE, WA

PROJECT MANAGER:	D BRAUNGARDT
INSPECTORS:	J WHELCHER S JOSHI
SURVEY DATES:	09/24/20-09/25/20 09/28/20-09/30-20
EHSI PROJECT #:	11420-01
DRAWN BY:	DIMALANTA
SCALE:	NTS
ISSUE DATE:	10/15/20

THIRD FLOOR

SL-4

GENERAL NOTES

- 1. DRAWING IS SCHEMATIC AND SAMPLE LOCATIONS ARE APPROXIMATE.
- 2. REFER TO REPORT FOR MORE INFORMATION ABOUT THE SAMPLED MATERIALS.

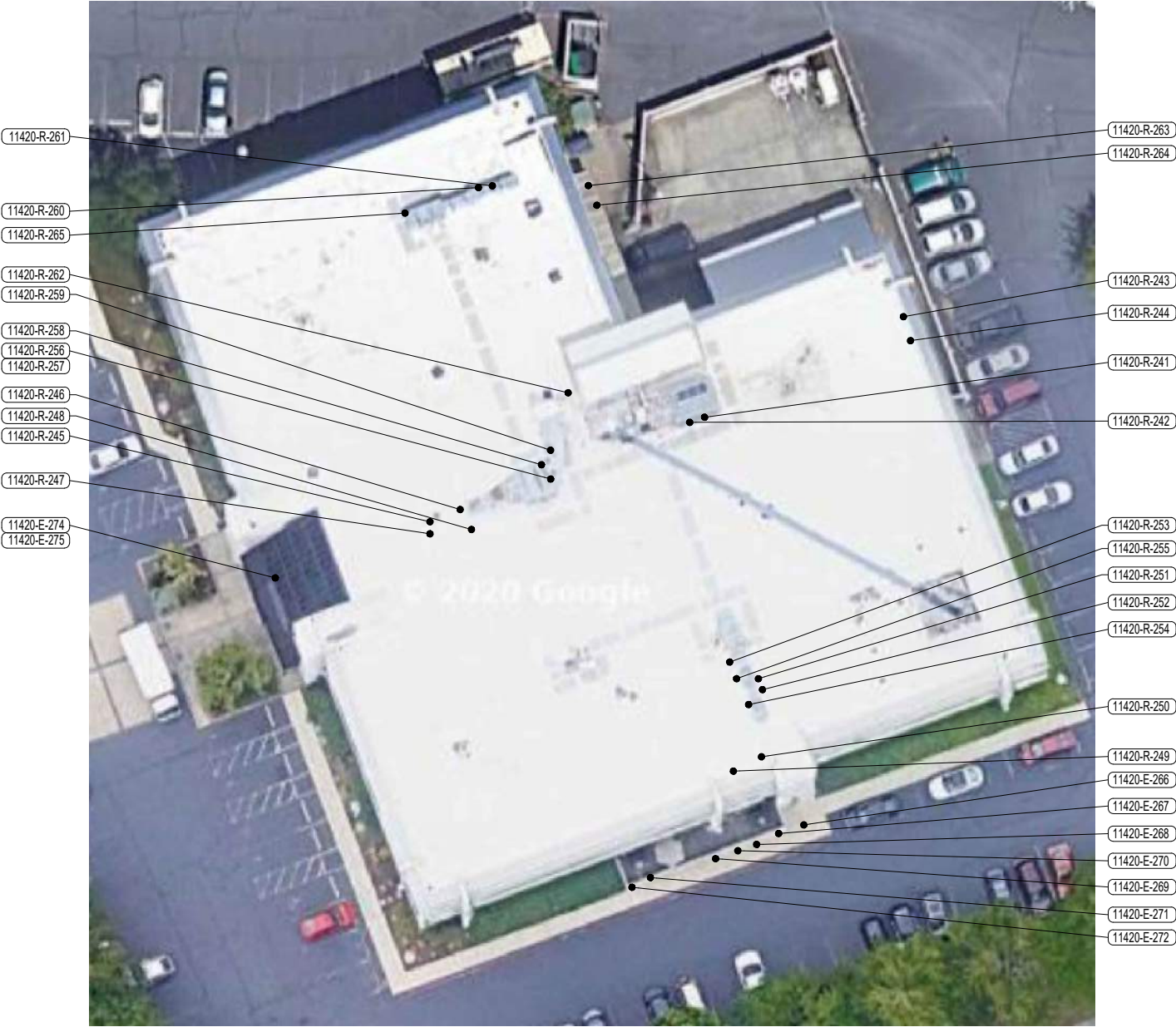
SAMPLE LEGEND

11420-E-XX	EXTERIOR BULK ASBESTOS SAMPLE LOCATIONS
11420-R-XX	ROOF BULK ASBESTOS SAMPLE LOCATIONS
11420-XX	SAMPLE NUMBER
11420-XX	IDENTIFIER
11420-XX	EHSI JOB NUMBER

ehsi

A Subsidiary of **SwannEarth Strategies**

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EXTERIOR AND ROOF  
NOT TO SCALE



SEATAC CITY HALL BUILDING  
4800 SOUTH 188TH STREET  
SEATAC, WA  
ARC ARCHITECTS  
SEATTLE, WA

PROJECT MANAGER:	D BRAUNGARDT
INSPECTORS:	J WHELCHER S JOSHI
SURVEY DATES:	09/24/20-09/25/20 09/28/20-09/30-20
EHSI PROJECT #	11420-01
DRAWN BY:	DIMALANTA
SCALE:	NTS
ISSUE DATE:	10/15/20

EXTERIOR  
AND ROOF

SL-5

# Tables

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-01 11420-F1-02	1	Council Chamber	Layer 1: 2'x2' Green/gray wavy pattern carpet squares Layer 2: Clear adhesive Layer 3: Clear mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-03	1	Council Chamber	Layer 1: 2'x2' Green carpet squares Layer 2: Clear mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-04	1	Council Chamber	Layer 1: 2'x2' Green carpet squares Layer 2: Clear adhesive Layer 3: Blue carpet adhesive (on wood)	ND (All Layers)	--	--	--	--
11420-F1-05 11420-F1-06	1	Private 103 Council Room	Layer 1: 2'x2' Green/gray wavy carpet squares Layer 2: Trace yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-07 11420-F1-08	1	Storage 104 Council Room	Layer 1: 9"x9" Off-white Vinyl Composition Tile (VCT) w/ green and gray dots Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-09 11420-F1-09QA 11420-F1-10	1	Storage 104 Council Room	Layer 1: 4" Gray cove base Layer 2: Yellow mastic on Gypsum Wallboard (GWB)	ND (All Layers)	--	--	--	--
11420-F1-11 11420-F1-12	1	Council Chamber	Layer 1: 4" Light brown cove base Layer 2: Off-white mastic (on wood under council members dias)	ND (All Layers)	--	--	--	--
11420-F1-13 11420-F1-14	1	Throughout 1st Floor	Gypsum wallboard (GWB) w/ paint (mid- wall)	ND (All Layers)	--	--	--	--
11420-F1-15 11420-F1-16 11420-F1-17	1	Throughout 1st Floor	Layer 1: Joint Compound (JC) w/ paint Layer 2: GWB (corner)	ND (All Layers)	--	--	--	--
11420-F1-18 11420-F1-19	1	Private 103 Council Chambers	Layer 1: Off-white w/ green swirl vinyl fibrous wall covering Layer 2: White fibrous insulation (on GWB)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-20 11420-F1-21	1	Private 103 Council Room	Black window glazing putty (on 62'x7' window system)	ND	--	--	--	--
11420-F1-22 11420-F1-23	1	Storage 104 Council Room Private 103 Council Room	2'x4' Off-white Suspended acoustic ceiling tile (SACT) w/ pinhole and worm track pattern w/ paint	ND	--	--	--	--
11420-F1-24	1	Private 103 Council Room	Off-white pipe dope (above SACT on copper line)	ND	--	--	--	--
11420-F1-25	1	Council Chamber	Layer 1: 2'x2' Gray SACT w/ wavy pinhole pattern w/ paint Layer 2: Silver paper backing	ND (All Layers)	--	--	--	--
11420-F1-26	1	Council Chamber	Gray pipe dope (above SACT on black water suppressant line)	ND	--	--	--	--
11420-F1-27	1	Council Chamber	Light gray pipe dope (above SACT on black water suppressant line)	ND	--	--	--	--
11420-F1-28	1	Council Chamber	Off white pipe dope (above SACT on black water suppressant line)	ND	--	--	--	--
11420-F1-29	1	Council Chamber	Layer 1: Silver foil Layer 2: Yellow fiberglass insulation (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-30	1	Council Chamber	2'x2' Off-white SACT w/ wavy pinhole pattern	ND	--	--	--	--
11420-F1-31	1	Lobby	Layer 1: 2'x2' Gray SACT w/ wavy pinhole pattern w/ paint Layer 2: Silver paper backing	ND (All Layers)	--	--	--	--
11420-F1-32	1	Lobby	Gray duct seam sealant (on ducting above SACT)	ND	--	--	--	--
11420-F1-33 11420-F1-34	1	Council Chamber	Off-white pipe dope (on fire suppressant line above SACT)	ND	--	--	--	--
11420-F1-35	1	Conference 102 Lobby	Layer 1: 16"x16" Gray/green carpet squares w/ wavy pattern Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-36 11420-F1-37	1	Lobby	Layer 1: Green Multi-colored rolled carpet Layer 2: Trace yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-38 11420-F1-39	1	Lobby	Layer 1: Pale/green woven surfacing material Layer 2: Clear adhesive Layer 3: Joint compound (JC) Layer 4: GWB (corner)	ND (All Layers)	--	--	--	--
11420-F1-40	1	Lobby	Layer 1: Pale/green woven surfacing material Layer 2: Clear adhesive Layer 3: GWB (mid-wall)	ND (All Layers)	--	--	--	--
11420-F1-41 11420-F1-42 11420-F1-43	1	Main Lobby	1'x2' White acoustic ceiling tile (ACT) w/ white craters (on metal frame)	ND	--	--	--	--
11420-F1-44 11420-F1-45	1	Court Room	Layer 1: 2'x2' Green/gray carpet squares w/ wavy pattern Layer 2: Clear mastic Layer 3: Leveling compound (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-46 11420-F1-47	1	Court Room	Layer 1: Rubber stair tread Layer 2: Clear mastic (on wood)	ND (All Layers)	--	--	--	--
11420-F1-48	1	Court Room	Off-white wood adhesive (on thin red wood grain panel/juror panel)	ND	--	--	--	--
11420-F1-49	1	Court Room	Layer 1: Thin red wood grain panel Layer 2: Green adhesive (on wood)	ND (All Layers)	--	--	--	--
11420-F1-50	1	Court Room	Layer 1: Pale green Formica countertop Layer 2: Clear mastic (on particle board)	ND (All Layers)	--	--	--	--
11420-F1-51	1	Court Room	Dark red adhesive compound (on particle board)	ND	--	--	--	--
11420-F1-52	1	Court Room	Off-white countertop seam sealant (on gypsum wallboard GWB)	ND	--	--	--	--



**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-53	1	Court Room	Layer 1: Pale green Formica countertop Layer 2: clear mastic (on particle board w/ off-white countertop sealant)	ND (All Layers)	--	--	--	--
11420-F1-54	1	Court Room	Red 3 hour firestop (above SACT on silver metal pipe)	ND	--	--	--	--
11420-F1-55	1	Court Room	Layer 1: JC Layer 2: Plaster (on concrete on column in courthouse)	ND (All Layers)	--	--	--	--
11420-F1-56	1	Riverton Room	Layer 1: JC Layer 2: GWB w/ paint (corner)	ND (All Layers)	--	--	--	--
11420-F1-57	1	Riverton Room	Layer 1: JC Layer 2: GWB w/ paint (corner)	ND (All Layers)	--	--	--	--
11420-F1-58	1	Riverton Room	GWB w/ paint (mid-wall)	ND	--	--	--	--
11420-F1-59	1	Main Lobby	Layer 1: Green multi-colored carpet w/ curved line pattern Layer 2: Clear adhesive Layer 3: off-white leveling compound (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-60	1	Main Lobby	Layer 1: 2'x2' Black/gray carpet squares Layer 2: Clear adhesive Layer 3: Black rubber backing Layer 4: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-61	1	Main Lobby	Layer 1: Dark blue/gray carpet squares Layer 2: Clear adhesive Layer 3: Leveling compound (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-62	1	Main Lobby	Layer 1: 2'x2' Black/gray carpet squares Layer 2: Clear adhesive (on concrete)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-63	1	Main Lobby	Layer 1: 1'x1' Multi-colored carpet Layer 2: Grout (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-64	1	Riverton Room	Layer 1: Off-white paper w/ silver backing Layer 2: Adhesive Layer 3: Fiberglass insulation (on 1" copper pipe above SACT)	ND (All Layers)	--	--	--	--
11420-F1-65	1	Riverton Room	Gray pipe dope (on fire suppression line)	ND	--	--	--	--
11420-F1-66 11420-F1-67	1	Riser	Gray duct seam sealant (on ducting in riser room)	ND	--	--	--	--
11420-F1-68	1	Riser	Red flange gasket (on red painted fire raiser)	ND	--	--	--	--
11420-F1-69	1	Riser	Layer 1: White paper Layer 2: Silver paper backing Layer 3: Fiberglass insulation (on copper pipe)	ND (All Layers)	--	--	--	--
11420-F1-70	1	Riser	Off-white pipe dope (around pipe fitting area on copper pipe)	ND	--	--	--	--
11420-F1-71	1	Riser	Blue/white pipe dope (around pipe fitting area on copper pipe)	ND	--	--	--	--
11420-F1-72	1	Riser	Black paper w/ adhesive/mastic (on copper pipe)	ND	--	--	--	--
11420-F1-73	1	Riser	Black/brown flange gasket (on copper pipe)	ND	--	--	--	--
11420-F1-74	1	Riser	Black/brown flange gasket (on copper pipe)	ND	--	--	--	--
11420-F1-75	1	Riser	Red flange gasket (on red painted fire raiser)	ND	--	--	--	--
11420-F1-76	1	Riser	Off-white pipe dope (around pipe fitting area on copper pipe)	ND	--	--	--	--
11420-F1-77	1	Riser	Blue/white pipe dope (around pipe fitting area on copper pipe)	ND	--	--	--	--

**Table 1**  
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**SeaTac City hall**  
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Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-78	1	Riser	Layer 1: White paper Layer 2: Silver paper backing Layer 3: Fiberglass insulation (on copper pipe)	ND (All Layers)	--	--	--	--
11420-F1-79 11420-F1-79QA	1	Riser	Black paper w/ adhesive/mastic (on copper pipe)	ND	--	--	--	--
11420-F1-80 11420-F1-80QA	1	Riser	White pipe tape (around black pipe connected to copper tape)	ND	--	--	--	--
11420-F1-81	1	Rise	White pipe tape (around black pipe connected to copper tape)	ND	--	--	--	--
11420-F1-82 11420-F1-82QA 11420-F1-83	1	Electric Room	Red 3 hour fire stop (on GWB)	ND	--	--	--	--
11420-F1-84	1	Parks	GWB w/ paint (on metal/concrete wall) (inaccessible area)	ND	--	--	--	--
11420-F1-85	1	Records	Layer 1: Gray cove base Layer 2: Yellow mastic (on GWB wall)	ND (All Layers)	--	--	--	--
11420-F1-86 11420-F1-87	1	Records	Layer 1: Cream vinyl composition tile w/ speckles Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-88 11420-F1-89	1	Office 1,Office 4 Parks	Layer 1: 2'x2' Gray/light green carpet squares Layer 2: Adhesive Layer 3: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-90	1	Lunch Room	Layer 1: Gray cove base Layer 2: Yellow mastic (on GWB wall)	ND (All Layers)	--	--	--	--
11420-F1-91	1	Lunch Room	Layer 1: 1'x1' Multi-colored vinyl composition tile Layer 2: Sealant Layer 3: Brown fibrous backing Layer 4: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-92	1	Lunch Room	Layer 1: 1'x1' Multi-colored vinyl composition tile w/ sealant <b>Layer 2: Brown fibrous backing</b> Layer 3: Yellow mastic (on concrete)	L1: ND <b>L2: 3% Chrysotile</b> L3: ND	~50	SF	Misc.	F
11420-F1-93	1	Lunch Room	Sink drain caulking (around disposal tube under sink)	ND	--	--	--	--
11420-F1-94	1	Riverton Room	Layer 1: Off-white paper Layer 2: Yellow fiberglass insulation (on 1" copper H2O line)	ND (All Layers)	~50	SF	TSI	F
11420-F1-95	1	Gym	Layer 1: Beige multi-colored vinyl composition tile Layer 2: Fibrous backing Layer 3: Yellow mastic Layer 4: Gray vinyl composition tile Layer 5: Mastic Layer 6: Gray vinyl composition tile w/ dots (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-96	1	Gym	Layer 1: Beige multi-colored vinyl composition tile Layer 2: Brown fibrous backing Layer 3: Mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-97	1	Men's Locker	Layer 1: Gray 9"x9" tile Layer 2: White mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-98	1	Men's Locker	Layer 1: Gray 9"x9" tile Layer 2: White mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-99 11420-F1-100	1	Gym	2'x4' Suspended acoustic ceiling tile (SACT) w/ pinhole pattern	ND	--	--	--	--
11420-F1-101	1	Men's Locker	Layer 1: Beige 9"x9" tile Layer 2: White mastic/adhesive Layer 3: Grout (on GWB)	ND (All Layers)	--	--	--	--
11420-F1-102	1	Gym	Layer 1: White paper Layer 2: Yellow fiberglass insulation (on pipe above SACT)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-103 11420-F1-103QA	1	Women's Locker	Sink drain pipe dope (on gasket under sink)	ND	--	--	--	--
11420-F1-104	1	Women's Locker	Layer 1: Beige/red 9'x9' tile Layer 2: White mastic (on GWB wall)	ND (All Layers)	--	--	--	--
11420-F1-105 11420-F1-105QA	1	Janitor	Red pipe glazing gasket (on white pipe in janitor closet)	ND	--	--	--	--
11420-F1-106 11420-F1-107	1	Janitor	<6" White fibrous mudded elbow	ND	6	Each	TSI	F
11420-F1-108 11420-F1-109	1	Hallway Outside Janitors Closet	Pink penetration sealant (above SACT outside bathroom)	ND	--	--	--	--
11420-F1-110 11420-F1-111	1	Electrical Room Next To Janitors Closet	Red fire stop (on penetration in wall)	ND	--	--	--	--
11420-F1-112	1	Men's Restroom	Layer 1: 1'x1' White/multi-colored floor tile Layer 2: Yellow mastic	ND (All Layers)	--	--	--	--
11420-F1-113	1	Men's Restroom	White caulking (in between tile in men's restroom along wall)	ND	--	--	--	--
11420-F1-114	1	Men's Restroom	Layer 1: 1'x1' White/multi-colored floor tile Layer 2: Yellow mastic	ND (All Layers)	--	--	--	--
11420-F1-115 11420-F1-116	1	Men's Restroom	Layer 1: 4"x4" White/gray tile Layer 2: Clear/white mastic/adhesive (on side walls)	ND (All Layers)	--	--	--	--
11420-F1-117 11420-F1-118	1	Waiting Area Court Clerk	Layer 1: Blue 1'x1' carpet square Layer 2: Clear adhesive Layer 3: Yellow mastic	ND (All Layers)	--	--	--	--
11420-F1-119 11420-F1-120	1	Waiting Area Court Clerk	Layer 1: Multi-colored 1'x1' carpet square Layer 2: Clear adhesive Layer 3: Yellow mastic	ND (All Layers)	--	--	--	--
11420-F1-121	1	Court Clerk Counter	Layer 1: Gray Formica countertop Layer 2: Clear adhesive (on wood)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-122	1	Hallway Outside Secure Area	Layer 1: Multi-colored carpet Layer 2: Blue vinyl composition tile Layer 3: Yellow mastic Layer 4: Black mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-123	1	Hallway Outside Secure Area	Layer 1: Multi-colored carpet Layer 2: Blue vinyl composition tile Layer 3: Yellow mastic Layer 4: Black mastic (on concrete)	ND (All Layers)	--	--	--	--
<b>11420-F1-124</b>	<b>1</b>	<b>Hallway Outside Secure Area</b>	<b>Black/yellow mastic (under carpet in hallway outside secure area)</b>	<b>6% Chrysotile</b>	<b>~50</b>	<b>SF</b>	<b>Misc.</b>	<b>NF</b>
11420-F1-125 11420-F1-126	1	Closet Outside Secure Area	Layer 1: Black cove base Layer 2: Yellow mastic (on GWB)	ND (All Layers)	--	--	--	--
11420-F1-127	1	Closet Outside Secure Area	Layer 1: White fibrous board Layer 2: Yellow mastic (on GWB)	ND (All Layers)	--	--	--	--
11420-F1-128	1	Interrogation Room	Layer 1: Blue fibrous cover Layer 2: Yellow mastic (on wall) (blue fibrous wall board panels)	ND (All Layers)	--	--	--	--
<b>11420-F1-129</b>	<b>1</b>	<b>Interrogation Room</b>	Layer 1: Blue fibrous cover <b>Layer 2: Yellow mastic (on wall) (blue fibrous wall board panels)</b>	<b>L1: ND L2: 8% Chrysotile</b>	<b>6</b>	<b>Each</b>	<b>Misc.</b>	<b>NF</b>
11420-F1-130	1	Fire Line Room	White pipe dope (on fire suppression line inside fire line room in secure area)	ND	--	--	--	--
11420-F1-131	1	Secure Area	Layer 1: Green rolled down carpet Layer 2: Clear adhesive	ND (All Layers)	--	--	--	--
11420-F1-132	1	Interrogation Room	Layer 1: 1'x1' ACT w/ pinhole pattern Layer 2: Brown Glue dots (on wood)	ND (All Layers)	--	--	--	--
11420-F1-133	1	Judge Office	Layer 1: 1'x1' Dark green carpet square Layer 2: Clear adhesive (on concrete)	ND (All Layers)	--	--	--	--
11420-F1-134 11420-F1-135	1	Restroom Behind Council Chamber	Layer 1: 1'x1' Beige tile Layer 2: White adhesive (on concrete)	ND (All Layers)	--	--	--	--



**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F1-136 11420-F1-137	1	Restroom Behind Council Chamber	Layer 1: 2'x2' White tile square Layer 2: Clear glue Layer 3: Paper backing (on GWB)	ND (All Layers)	--	--	--	--
11420-F2-138 11420-F2-139 11420-F2-140 11420-F2-141 11420-F2-142 11420-F2-143 11420-F2-144	2	Human Resources-Office, Lobby Legal Lobby, Hallway Outside Room 210	GWB w/ paint	ND	--	--	--	--
<b>11420-F2-145</b>	<b>2</b>	<b>Human Resources</b>	Layer 1: Multi-colored carpet Layer 2: Adhesive <b>Layer 3: Yellow mastic (on concrete)</b>	L1: ND L2: ND <b>L3: 5% Chrysotile</b>	<b>~200</b>	<b>SF</b>	<b>Misc.</b>	<b>NF</b>
11420-F2-146	2	Human Resources Kitchen	Layer 1: 6" Cove base Layer 2: White mastic (on GWB)	ND (All Layers)	--	--	--	--
11420-F2-147	2	Human Resources	Layer 1: Multi-colored carpet Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-148	2	Human Resources Kitchen	Layer 1: Light blue fibrous tack board countertop Layer 2: Clear mastic (on wood)	ND (All Layers)	--	--	--	--
11420-F2-149	2	Human Resources Kitchen	Layer 1: Blue tack board Layer 2: Yellow mastic/adhesive (black splash to countertop)	ND (All Layers)	--	--	--	--
11420-F2-150	2	Training Room	Layer 1: 6" Gray cove base Layer 2: Yellow mastic (on GWB)	ND (All Layers)	--	--	--	--
<b>11420-F2-151</b>	<b>2</b>	<b>Training Room</b>	Layer 1: Multi-colored carpet Layer 2: White fibrous backing Layer 3: Leveling compound <b>Layer 4: Vinyl composition tile</b> <b>Layer 5: Black mastic (on concrete)</b>	L1: ND L2: ND L3: ND <b>L4: 7% Chrysotile</b> <b>L5: 10% Chrysotile</b>	<b>~200</b>	<b>SF</b>	<b>Misc.</b>	<b>NF</b>
<b>11420-F2-152</b>	<b>2</b>	<b>Training Room</b>	<b>Layer 1: 1'x1' Vinyl composition tile</b> <b>Layer 2: Black mastic (in HR under construction room under carpet)</b>	<b>L1: 7% Chrysotile</b> <b>L2: 10% Chrysotile</b>	<b>~200</b>	<b>SF</b>	<b>Misc.</b>	<b>NF</b>

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F2-153 11420-F2-154	2	Hallway Outside Room 260, Outside Men's Restroom	Layer 1: 6" Tan cove base Layer 2: Yellow mastic (on GWB)	ND (All Layers)	--	--	--	--
11420-F2-155	2	Human Resources Kitchen	Layer 1: 1'X1' Vinyl floor tile Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-156 11420-F2-157	2	Legal Lobby	Brown/yellow pipe dope (on black fire suppression line )	ND	--	--	--	--
11420-F2-158 11420-F2-159	2	Legal Kitchen	Layer 1: 1'X1' Multi-colored vinyl floor tile Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-160	2	Hallway Outside Human Resources	Lauer 1: 6" Gray cove base Layer 2: Yellow mastic (on wall)	ND (All Layers)	--	--	--	--
11420-F2-161	2	Legal Kitchen	Layer 1: Rose Formica countertop Layer 2: Green adhesive (on wood)	ND (All Layers)	--	--	--	--
11420-F2-162 11420-F2-163	2	Lobby	Black window glazing gasket (on window system in lobby 25'4"x5')	ND	--	--	--	--
11420-F2-164	2	Human Resources Conference Room	White texturing JC (on pillar on concrete)	ND	--	--	--	--
11420-F2-165 11420-F2-166	2	Electrical Room	Red penetration sealant (around bottom of silver pipe next to door)	ND	--	--	--	--
11420-F2-167 11420-F2-168	2	Electrical Room	Gray penetration sealant (around bottom of silver pipe in west corner)	ND	--	--	--	--
11420-F2-169 11420-F2-170	2	Electrical Room	Pink floor penetration sealant (around pipe in between red& gray sealant)	ND	--	--	--	--
11420-F2-171 11420-F2-172	2	Freight Hallway	Layer 1: Green/gray 1'x1' carpet square Layer 2: White fibrous backing Layer 3: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F2-173	2	Freight Hallway	Layer 1: 1'x1' Gray vinyl tile Layer 2: Yellow mastic Layer 3: Old 1'x1' vinyl composition tile <b>Layer 4: Black mastic (on concrete)</b>	L1: ND L2: ND L3: ND <b>L4: 3% Chrysotile</b>	~150	SF	Misc.	NF
11420-F2-174	2	Freight Hallway	Layer 1: 1'x1' Gray vinyl tile Layer 2: Yellow mastic Layer 3: Old 1'x1' vinyl composition tile <b>Layer 4: Black mastic (on concrete)</b>	L1: ND L2: ND L3: ND <b>L4: 4% Chrysotile</b>	~150	SF	Misc.	NF
11420-F2-175 11420-F2-176 11420-F2-177	2	Electrical Room	Layer 1: Brown fibrous mesh Layer 2: Brown mud Layer 3: White powdery material (mudded elbow)	ND (All Layers)	6	Each	TSI	F
11420-F3-178	3	Computer Room	Layer 1: 1'x1' Gray vinyl composition tile w/ dark gray spots Layer 2: Black mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F3-179	3	Computer Room	Layer 1: 1'x1' Gray vinyl composition tile w/ dark gray spots Layer 2: Black mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F3-180 11420-F3-181	3	Electrical Room	Gray floor penetration sealant	ND	--	--	--	--
11420-F3-182 11420-F3-183	3	Electrical Room	Pink floor penetration sealant (on concrete around pipe)	ND	--	--	--	--
11420-F3-184 11420-F3-185	3	Electrical Room	Red floor penetration sealant (on concrete)	ND	--	--	--	--
11420-F3-186 11420-F2-187	3	Janitors Closet	Layer 1: Beige Mesh Layer 2: Mudded elbow Layer 3: White fibrous TSI (mudded elbow)	ND (All Layers)	6	Each	TSI	F
11420-F3-188	3	Electrical Room	Layer 1: JC Layer 2: GWB w/ paint (corner)	ND (All Layers)	--	--	--	--
11420-F3-189	3	Electrical Room	GWB w/ paint (mid-wall)	ND	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F3-190	3	Janitors Closet	Layer 1: Beige Mesh Layer 2: Mudded elbow Layer 3: White fibrous TSI (mudded elbow)	ND (All Layers)	6	Each	TSI	F
11420-F3-191 11420-F3-192	3	Reception	Layer 1: 1'x1' Blue/light blue carpet square Layer 2: Adhesive Layer 3: Leveling compound Layer 4: Green mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F3-193 11420-F3-164	3	Reception	Layer 1: Green Formica countertop Layer 2: Clear mastic (countertop of reception desk)	ND (All Layers)	--	--	--	--
11420-F3-195 11420-F3-196	3	Room 345	Layer 1: 1'x1' Light green carpet square Layer 2: Black mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F3-197	3	Hallway Outside Women's Restroom	2'x2' SACT w/ pinhole & worm track pattern	ND	--	--	--	--
11420-F3-198 11420-F3-199	3	Kitchen	Layer 1: Beige 1'x1' vinyl composition tile w/ blue streaks Layer 2: Fibrous backing Layer 3: Yellow mastic w/ seam caulking (on concrete)	ND (All Layers)	--	--	--	--
11420-F3-200 11420-F3-201	3	Kitchen	Layer 1: Gray/cream Formica Layer 2: Green adhesive (on particle board)	ND (All Layers)	--	--	--	--
11420-F3-202 11420-F3-203	3	Commons #1, Office #2	White texturing JC (on pillar above SACT on concrete)	ND	--	--	--	--
11420-F3-204	3	Office #2	2'x2' White SACT w/ wormhole & pinhole pattern	ND	--	--	--	--
11420-F3-205	3	Commons #2	White texturing JC (on pillar above SACT on concrete)	ND	--	--	--	--
11420-F3-206 11420-F3-207	3	Mini Kitchen	Layer 1: Gray speckled Formica countertop Layer 2: Yellow mastic (on particle board)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F3-208	3	Paper Storage	Layer 1: JC Layer 2: GWB w/ paint (corner)	ND (All Layers)	--	--	--	--
11420-F3-209 11420-F3-210	3	Paper Storage	Layer 1: Gray carpet w/ fibrous backing Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F3-211	3	Room 325 Above SACT	Gray pipe dope (on black water suppression line above SACT)	ND	--	--	--	--
11420-F2-212 11420-F2-213	2	Key Insurance	Layer 1: Cream/beige 1'x1' carpet square Layer 2: Gray rubber backing Layer 3: Trace yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-214 11420-F2-215	2	Key Insurance	Layer 1: Multi-colored rolled carpet Layer 2: White mesh backing Layer 3: Yellow mastic Layer 4: Wood (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-216 11420-F2-217	2	Key Insurance Kitchen	Layer 1: 2'x2' White vinyl composition tile Layer 2: Clear adhesive Layer 3: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-218 11420-F2-219	2	Key Insurance Kitchen	Layer 1: Green Formica Layer 2: Trace green adhesive (on wood)	ND (All Layers)	--	--	--	--
11420-F2-220 11420-F2-220QA 11420-F2-221	2	ReWa	Layer 1: 1'x1' Pink w/ pink streaks vinyl composition tile Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-222 11420-F2-222QA 11420-F2-223	2	ReWa	Layer 1: 2'x2' Gray/multi-colored carpet square Layer 2: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-F2-224 11420-F2-224QA 11420-F2-225	2	ReWa	Layer 1: Black cove base Layer 2: Yellow/off-white mastic (on GWB)	ND (All Layers)	--	--	--	--
11420-F2-226	3	ReWa Kitchen	Layer 1: Black carpet Layer 2: Yellow mastic (on concrete inside electrical closet in kitchen)	ND (All Layers)	--	--	--	--
11420-F2-227 11420-F2-228	2	ReWa Office Multi-Purpose Room	Black window seam sealant (on window between office & common space)	ND	--	--	--	--
11420-F2-229 11420-F2-230	2	City Of SeaTac Tenant	Layer 1: Blue Formica Layer 2: Clear/yellow mastic (on wood)	ND (All Layers)	--	--	--	--
11420-F2-231 11420-F2-232	2	City Of SeaTac Tenant	Layer 1: Multi-colored carpet Layer 2: Off-white mesh backing Layer 3: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-233 11420-F2-234	2	Seattle Southside Chamber of Commerce (Kitchen)	Layer 1: White 2'x2' tile Layer 2: Adhesive Layer 3: Yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-F2-235 11420-F2-236	2	Seattle Southside Chamber of Commerce (Kitchen)	Layer 1: Multi-colored Formica Layer 2: Yellow mastic (on wood)	ND (All Layers)	--	--	--	--
11420-F2-237 11420-F2-238	2	Seattle Southside Chamber of Commerce	Black window glazing putty (on office window between common space)	ND	--	--	--	--
11420-F2-239 11420-F2-240	2	Office 260	Layer 1: Multi-colored carpet Layer 2: Trace yellow mastic (on concrete)	ND (All Layers)	--	--	--	--
11420-R-241 11420-R-242	4	Roof	Red/white seam sealant (on red base of water tower)	ND	--	--	--	--
11420-R-243 11420-R-243QA 11420-R-244	4	Roof	Layer 1: Black asphaltic roofing material Layer 2: Gray putty (under metal flashing on parapet wall)	ND (All Layers)	--	--	--	--



**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-R-245	4	Roof	Gray pipe penetration sealant (around vents coming out of roof)	ND	--	--	--	--
11420-R-246 11420-R-247	4	Roof	Black pipe penetration sealant (around vents coming out of roof)	ND	--	--	--	--
11420-R-248 11420-R-248QA	4	Roof	Light gray rubber seam sealant (on condensation drain line)	ND	--	--	--	--
11420-R-249	4	Roof	Black/gray seam sealant (on parapet wall connecting to concrete wall)	ND	--	--	--	--
11420-R-250	4	Roof	White seam sealant (on outer wall between parapet & concrete wall)	ND	--	--	--	--
11420-R-251 11420-R-251QA	4	Roof	Layer 1: Silver paper Layer 2: Yellow mastic (on flex of AHU)	ND (All Layers)	--	--	--	--
11420-R-252	4	Roof	Layer 1: Silver paper Layer 2: Yellow mastic (on flex of AHU)	ND (All Layers)	--	--	--	--
11420-R-253	4	Roof	White flex paper (on AHU top side & corners)	ND	--	--	--	--
<b>11420-R-254</b>	<b>4</b>	<b>Roof</b>	<b>White flex paper (on AHU top side &amp; corners)</b>	<b>2% Chrysotile</b>	<b>~75</b>	<b>SF</b>	<b>Misc.</b>	<b>NF</b>
<b>11420-R-255</b>	<b>4</b>	<b>Roof</b>	<b>Black flex duct (on AHU unit)</b>	<b>8% Chrysotile</b>	<b>~75</b>	<b>SF</b>	<b>Misc.</b>	<b>NF</b>
11420-R-256 11420-R-257	4	Roof	White flex duct (on AHU unit)	ND	--	--	--	--
11420-R-258	4	Roof	Gray duct seam sealant (on AHU) (Patch)	ND	--	--	--	--
11420-R-259	4	Roof	Gray duct seam sealant (On AHU top side)	ND	--	--	--	--
<b>11420-R-260</b>	<b>4</b>	<b>Roof</b>	Layer 1: White flex paper <b>Layer 2: Red mastic (on AHU top side &amp; corner)</b>	L1: ND <b>L2: 6% Chrysotile</b>	<b>~50</b>	<b>SF</b>	<b>Misc.</b>	<b>NF</b>
11420-R-261	4	Roof	Gray duct seam sealant (on AHU sides)	ND	--	--	--	--
11420-R-262	4	Roof	Wall seam sealant (on concrete wall connecting metal baseboard) (on stairwell enclosure)	ND	--	--	--	--

**Table 1**  
**Summary of Asbestos Bulk Sampling and Analytical Results**  
**SeaTac City hall**  
**EHSI Project Number: 11420**

Sample Number	Floor	HSA Location	Homogenous Material/ Sample Description	Result	Quantity	Units	Material Type (Misc., TSI, Surfacing)	Friable/ Non- Friable
11420-R-263	4	Roof	Gray sealant (at metal panels on exterior of walls)	ND	--	--	--	--
11420-R-264	4	Roof	Gray sealant (at metal panels on exterior of walls)	ND	--	--	--	--
<b>11420-R-265</b>	<b>4</b>	<b>Roof</b>	Layer 1: White flex paper <b>Layer 2: Red mastic (on AHU top side &amp; corner)</b>	L1: ND L2: 6% Chrysotile	~50	SF	Misc.	F
11420-E-266 11420-E-267 11420-E-268	E	Exterior	Black window glazing putty (on window frame system exterior 68'x7')	ND	--	--	--	--
11420-E-269	E	Exterior	White paint on black caulking (under window frame system 68'x7')	ND	--	--	--	--
11420-E-270 11420-E-271	E	Exterior	Gray caulking (between concrete & wall expansion on floor)	ND	--	--	--	--
11420-E-272	E	Exterior	Black window glazing putty (on window frame system exterior 68'x7')	ND	--	--	--	--
11420-F2-273	2	Hallway Outside Men's Restroom	Green caulking (on drinking fountain on wall)	ND	--	--	--	--
11420-E-274 11420-E-275	E	Exterior	Black window glazing putty (on slanted glass on front side of city hall 40'x48' window system)	ND	--	--	--	--
11420-F1-276	1	Outside Men's Restroom	White caulking (on/around drinking fountain on wall)	ND	--	--	--	--

**NOTES:**

**Bold text** indicates sample or layer is an asbestos-containing material.

**ACRONYMS:**

ACT = acoustic ceiling tile

B = Basement

AHU = air handling unit

E = Exterior

F = friable

GWB = gypsum wall board

HSA = homogenous sample area

JC = joint compound

ND = non-detect

NF = non-friable

OD = outside diameter

SACT = suspended acoustic ceiling tile

SVF = sheet vinyl Flooring

TSI = thermal system insulation

VAT = vinyl asbestos tile

VCT = vinyl composition tile

**Table 2**  
**Summary of Lead Bulk Sampling and Analytical Results**  
**SeaTac City Hall**  
**EHSI Project No.: 11420**

Sample Number	Location	Component / Substrate	Color	Results % Lead by Weight
11420-Pb-01	Exterior	AHU/ Metal	Blue	<0.039
11420-Pb-02	Exterior	AHU/ Metal	Blue	<0.056
11420-Pb-03	Exterior	Wall/ Concrete	Off-white	<0.0050
11420-Pb-04	Exterior	Handrail/ Metal	Gray	<0.016

**Table 3**  
**Summary of PCB Light Ballasts, Mercury, and other Regulated Materials**  
**SeaTac City Hall**  
**EHSI Project No.: 11420**

MATERIAL DESCRIPTION	LOCATION	QUANTITY	FIXTURES	LIGHT TUBES	MAGNETIC BALLASTS
2'x4' Mounted light fixture w/ 2 light tubes and 1 magnetic ballast	Throughout	--	513	1026	513
2'x2' Mounted light fixture w/ 1 light tubes and 1 magnetic ballast	Throughout	--	65	65	65
2'x4' Mounted light fixture w/ 3 light tubes and 2 magnetic ballasts	Throughout	--	18	54	36
9"x21" Mounted light fixture w/ 1 light bulb and 1 magnetic ballast	Throughout	--	19	19	19
Exit Signs	Counsel Room and 1st Floor Lobby	3	--	--	--
Refrigerator (Frigidaire), refrigerant 134A	3rd Floor	1	--	--	--
Refrigerator (General Electric), refrigerant 134A	3rd Floor	1	--	--	--
Refrigerator (Kenmore), refrigerant 134A	2nd Floor	2	--	--	--
Refrigerator (Samsung), refrigerant 134A	2nd Floor	1	--	--	--
Refrigerator (Whirlpool), refrigerant 134A	2nd Floor	1	--	--	--
Drinking Fountain	1st Floor	1	--	--	--
Drinking Fountain	2nd Floor	1	--	--	--
Drinking Fountain	3rd Floor	1	--	--	--
<b>TOTAL</b>		<b>12</b>	<b>615</b>	<b>1,164</b>	<b>633</b>

# **Appendix A**

## **Inspector Certifications**

# Certificate of Completion

This is to certify that  
**Joel W. Whelchel**  
has satisfactorily completed  
4 hours of refresher training as an  
**AHERA Building Inspector**

to comply with the training requirements of  
TSCA Title II, 40 CFR 763 (AHERA)

EPA Provider # 1085

176900  
Certificate Number



Instructor

Feb 5, 2020  
Date(s) of Training

Expires in 1 year.

Exam Score: N/A  
(if applicable)

ARGUS PACIFIC, INC / 21905 64th AVE W, SUITE 100 / MOUNTLAKE TERRACE, WASHINGTON 98043 / 206.285.3373 / ARGUSPACIFIC.COM



# Certificate of Completion

This is to certify that

**Sunny Joshi**

has satisfactorily completed  
4 hours of online refresher training as an  
**AHERA Building Inspector**

to comply with the training requirements of  
TSCA Title II, 40 CFR 763 (AHERA)

EPA Provider # 1085

178438

Certificate Number



Jul 8, 2020

Expires in 1 year.

Date(s) of Training

Exam Score: N/A  
(if applicable)

A handwritten signature in black ink, appearing to read "AZ", is written over a horizontal line.

Instructor: Andre Zwanenburg

ARGUS PACIFIC, INC / 21905 64th AVE W, SUITE 100 / MOUNTLAKE TERRACE, WASHINGTON 98043 / 206.285.3373 / ARGUSPACIFIC.COM

# **Appendix B**

## **Laboratory Analytical Reports and Chain-of-Custody Forms**

October 5, 2020



David Braungardt  
EHS International  
1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2016319.00**

Client Project: 11420-01  
Location: ARC SeaTac City Hall

Dear Mr. Braungardt,

Enclosed please find test results for the 40 sample(s) submitted to our laboratory for analysis on 9/30/2020.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

A handwritten signature in black ink, appearing to read 'Matt Macfarlane'.

Matt Macfarlane, Asbestos Lab Supervisor



The logo for NVLAP (National Voluntary Laboratory Accreditation Program). It consists of the letters 'NVLAP' in a large, stylized, outlined font.

Lab Code: 102063-0

Enc.: Sample Results

**Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)**  
**4708 Aurora Avenue North | Seattle, WA 98103-6516**



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

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**Lab ID: 20105050      Client Sample #: 11420-F1-01**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Layer 1 of 2      Description:** Beige and gray woven fibrous material with gray soft backing

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles	Synthetic fibers 71%
	Glass fibers 2%

**Asbestos Type: %  
None Detected ND**

**Layer 2 of 2      Description:** Trace yellow soft mastic with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder, Fine particles, Debris	Cellulose <1%

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105051      Client Sample #: 11420-F1-02**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Layer 1 of 2      Description:** Gray and beige woven fibrous material with gray soft backing

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles	Synthetic fibers 68%
	Glass fibers 4%

**Asbestos Type: %  
None Detected ND**

**Layer 2 of 2      Description:** Trace yellow soft mastic with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder, Fine particles, Debris	Cellulose <1%
	Synthetic fibers <1%

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105052      Client Sample #: 11420-F1-03**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 2</b>	<b>Description:</b> Gray/green woven fibrous material with gray soft backing		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 66%	<b>None Detected ND</b>
		Glass fibers 3%	

<b>Layer 2 of 2</b>	<b>Description:</b> Clear soft adhesive with debris		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	Cellulose <1%	<b>None Detected ND</b>

**Lab ID: 20105053**      **Client Sample #: 11420-F1-04**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray/green woven fibrous material with gray soft backing		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 68%	<b>None Detected ND</b>
		Glass fibers 4%	

<b>Layer 2 of 2</b>	<b>Description:</b> Clear soft adhesive with debris		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	Cellulose <1%	<b>None Detected ND</b>
		Synthetic fibers <1%	

**Lab ID: 20105054**      **Client Sample #: 11420-F1-05**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Green and white woven fibrous material with gray soft backing		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 66%	<b>None Detected ND</b>
		Glass fibers 5%	

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 2 of 2</b>	<b>Description:</b> Clear soft adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>

---

**Lab ID: 20105055**      **Client Sample #: 11420-F1-06**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Green and white woven fibrous material with gray soft backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 69%		<b>None Detected ND</b>
		Glass fibers 4%		

<b>Layer 2 of 2</b>	<b>Description:</b> Clear soft adhesive with trace yellow mastic and debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>
	Mastic/Binder	Synthetic fibers <1%		

---

**Lab ID: 20105056**      **Client Sample #: 11420-F1-07**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

<b>Layer 1 of 2</b>	<b>Description:</b> Black speckled beige vinyl			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Trace yellow mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

---

**Lab ID: 20105057**      **Client Sample #: 11420-F1-08**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Date:** 10/05/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 1 of 2	Description: Black speckled beige vinyl	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Vinyl/Binder, Fine grains, Fine particles	None Detected ND	
Layer 2 of 2	Description: Trace yellow mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Mastic/Binder, Fine particles	None Detected ND	

**Lab ID: 20105058 Client Sample #: 11420-F1-09**

Location: ARC SeaTac City Hall

Layer 1 of 2	Description: Gray rubbery material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Vinyl/Binder, Fine particles	None Detected ND	
Layer 2 of 2	Description: Off-white soft mastic with paint and trace paper	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Mastic/Binder, Fine particles, Paint	Cellulose 5%	

**Lab ID: 20105059 Client Sample #: 11420-F1-10**

Location: ARC SeaTac City Hall

Layer 1 of 2	Description: Gray rubbery material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Vinyl/Binder, Fine particles	None Detected ND	
Layer 2 of 2	Description: Off-white soft mastic with paint and trace paper	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Mastic/Binder, Fine particles, Paint	Cellulose 6%	

**Lab ID: 20105060 Client Sample #: 11420-F1-11**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 2</b>	<b>Description:</b> Red/brown rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Trace off-white soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105061** **Client Sample #: 11420-F1-12**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

<b>Layer 1 of 2</b>	<b>Description:</b> Red/brown rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Trace off-white soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	Cellulose <1%		<b>None Detected ND</b>

**Lab ID: 20105062** **Client Sample #: 11420-F1-13**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Thin white compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles, Paint	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Fine grains, Fine particles	Cellulose 23%		<b>None Detected ND</b>
		Glass fibers 3%		

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Lab ID: 20105063 Client Sample #: 11420-F1-14**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** White chalky material with paper and paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Gypsum/Binder, Fine grains, Fine particles	Cellulose 26%
Paint	Glass fibers 3%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105064 Client Sample #: 11420-F1-15**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Layer 1 of 3 Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles, Paint	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 3 Description:** Trace white compacted powdery material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles	Cellulose 47%

**Asbestos Type: %**  
**None Detected ND**

**Layer 3 of 3 Description:** White chalky material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%
Gypsum/Binder, Fine grains, Fine particles	Cellulose 24%
	Glass fibers 4%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105065 Client Sample #: 11420-F1-16**

Location: ARC SeaTac City Hall

**Layer 1 of 2 Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles, Paint	Cellulose <1%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 2</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Fine grains, Fine particles	Cellulose 25%		<b>None Detected ND</b>
		Glass fibers 3%		

**Lab ID: 20105066**      **Client Sample #: 11420-F1-17**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 1 for further analysis.

<b>Layer 1 of 3</b>	<b>Description:</b> Trace white compacted powdery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 3</b>	<b>Description:</b> White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles, Paint	Cellulose <1%		<b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Fine grains, Fine particles	Cellulose 22%		<b>None Detected ND</b>
		Glass fibers 3%		

**Lab ID: 20105067**      **Client Sample #: 11420-F1-18**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> White and gold fibrous woven fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 83%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> White fluffy fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 93%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

---

**Lab ID: 20105068      Client Sample #: 11420-F1-19**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** White and gold fibrous woven fibrous material

Non-Fibrous Materials:      Other Fibrous Materials: %

Binder/Filler, Fine particles      Synthetic fibers    83%

**Asbestos Type: %**

**None Detected ND**

**Layer 2 of 2      Description:** White fluffy fibrous material

Non-Fibrous Materials:      Other Fibrous Materials: %

Binder/Filler, Fine particles      Synthetic fibers    93%

**Asbestos Type: %**

**None Detected ND**

---

**Lab ID: 20105069      Client Sample #: 11420-F1-20**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Black rubbery material with debris

Non-Fibrous Materials:      Other Fibrous Materials: %

Binder/Filler, Fine particles, Fine grains      Cellulose    <1%

**Asbestos Type: %**

**None Detected ND**

---

**Lab ID: 20105070      Client Sample #: 11420-F1-21**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Black rubbery material with debris

Non-Fibrous Materials:      Other Fibrous Materials: %

Binder/Filler, Fine particles, Fine grains      None Detected    ND

**Asbestos Type: %**

**None Detected ND**

---

**Lab ID: 20105071      Client Sample #: 11420-F1-22**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:      Other Fibrous Materials: %

Binder/Filler, Fine particles, Glass debris      Cellulose    62%

Paint      Glass fibers    12%

**Asbestos Type: %**

**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

---

**Lab ID: 20105072      Client Sample #: 11420-F1-23**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 2      Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Glass debris	Cellulose 62%
Paint	Glass fibers 12%

**Asbestos Type: %  
None Detected ND**

**Layer 2 of 2      Description:** Thin tan fibrous material with clear adhesive and foil

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Adhesive/Binder, Metal foil	Cellulose 61%

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105073      Client Sample #: 11420-F1-24**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Off-white soft material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Debris	Synthetic fibers 5%
	Wollastonite 3%
	Talc fibers 2%
	Cellulose <1%

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105074      Client Sample #: 11420-F1-25**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** Thin tan fibrous material with clear adhesive with foil

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Adhesive/Binder, Metal foil	Cellulose 61%

**Asbestos Type: %  
None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 2 of 2</b>	<b>Description:</b> White crumbly fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Glass debris, Fine particles	Glass fibers 63%		<b>None Detected ND</b>
		Cellulose 10%		

---

**Lab ID: 20105075**      **Client Sample #: 11420-F1-26**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Gray soft crumbly material with debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Debris	Cellulose 2%		<b>None Detected ND</b>

---

**Lab ID: 20105076**      **Client Sample #: 11420-F1-27**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> White soft crumbly material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Fine grains	Synthetic fibers 2%		<b>None Detected ND</b>
	Paint	Cellulose 2%		

---

**Lab ID: 20105077**      **Client Sample #: 11420-F1-28**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> White soft crumbly material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Fine grains	Synthetic fibers 3%		<b>None Detected ND</b>
	Paint	Cellulose 2%		

---

**Lab ID: 20105078**      **Client Sample #: 11420-F1-29**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 2</b>	<b>Description:</b> White woven fibrous mesh with paper and foil with clear adhesive		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Adhesive/Binder, Metal foil	Cellulose 55%	<b>None Detected ND</b>
		Glass fibers 12%	

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow fluffy fibrous material		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Glass debris, Fine particles	Glass fibers 95%	<b>None Detected ND</b>

**Lab ID: 20105079**      **Client Sample #: 11420-F1-30**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 2</b>	<b>Description:</b> White fibrous material with paint		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Paint	Cellulose 61%	<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> White crumbly fibrous material with paint		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Glass debris, Fine grains	Glass fibers 92%	<b>None Detected ND</b>
	Paint		

**Lab ID: 20105080**      **Client Sample #: 11420-F1-31**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Tan fibrous material with foil and clear adhesive		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Adhesive/Binder, Metal foil	Cellulose 55%	<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> White crumbly fibrous material		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Glass debris, Fine grains	Glass fibers 96%	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Lab ID: 20105081**      **Client Sample #: 11420-F1-32**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** Gray soft material

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
Binder/Filler, Fine particles	None Detected    ND	<b>None Detected ND</b>

**Lab ID: 20105082**      **Client Sample #: 11420-F1-33**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** Beige crumbly material with debris

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
Binder/Filler, Fine grains, Fine particles	Synthetic fibers    3%	<b>None Detected ND</b>
Debris	Cellulose    2%	

**Lab ID: 20105083**      **Client Sample #: 11420-F1-34**

Location: ARC SeaTac City Hall

**Layer 1 of 2**      **Description:** White and green woven fibrous material with soft gray backing

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
Binder/Filler, Fine particles, Fine grains	Synthetic fibers    67%	<b>None Detected ND</b>
	Glass fibers    4%	

**Layer 2 of 2**      **Description:** Thin yellow soft mastic with debris

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
Mastic/Binder, Fine particles, Debris	Cellulose    <1%	<b>None Detected ND</b>

**Lab ID: 20105084**      **Client Sample #: 11420-F1-35**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

<b>Layer 1 of 2</b>	<b>Description:</b> White and green woven fibrous material with soft gray backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Fine grains	Synthetic fibers 65%		<b>None Detected ND</b>
		Glass fibers 5%		
<b>Layer 2 of 2</b>	<b>Description:</b> Thin yellow soft mastic with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>
		Hair <1%		

**Lab ID: 20105085**      **Client Sample #: 11420-F1-36**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

<b>Layer 1 of 2</b>	<b>Description:</b> Multicolored woven fibrous material with gray foamy backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Synthetic foam	Synthetic fibers 71%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Trace yellow soft adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>

**Lab ID: 20105086**      **Client Sample #: 11420-F1-37**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

<b>Layer 1 of 2</b>	<b>Description:</b> Multicolored woven fibrous material with gray foamy backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Synthetic foam	Synthetic fibers 73%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 2 of 2</b>	<b>Description:</b> Trace yellow soft adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	None Detected	ND	<b>None Detected ND</b>

---

**Lab ID: 20105087**      **Client Sample #: 11420-F1-38**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> White compacted powdery material with paint and white fibrous mesh			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Calcareous binder, Cementitious particles, Paint	Cellulose	25%	<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Thin white compacted powdery material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles	Cellulose	43%	<b>None Detected ND</b>

---

**Lab ID: 20105088**      **Client Sample #: 11420-F1-39**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

<b>Layer 1 of 2</b>	<b>Description:</b> Thin white compacted powdery material with paint & white fibrous mesh with thin white mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Calcareous binder, Cementitious particles, Paint	Cellulose	21%	<b>None Detected ND</b>
	Mastic/Binder			

<b>Layer 2 of 2</b>	<b>Description:</b> Trace white compacted powdery material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles	Cellulose	46%	<b>None Detected ND</b>

---

**Lab ID: 20105089**      **Client Sample #: 11420-F1-40**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016319.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 1 of 2	Description: White fibrous mesh with thin white mastic and paint	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Mastic/Binder, Paint	Cellulose 53%	
Layer 2 of 2	Description: White chalky material with paper	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Gypsum/Binder, Fine grains, Fine particles	Cellulose 25%	
			Glass fibers 4%	

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/05/2020

**Date:** 10/05/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016319.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/7/2020 **Time** 8:00 AM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	20105050	11420-F1-01		A
2	20105051	11420-F1-02		A
3	20105052	11420-F1-03		A
4	20105053	11420-F1-04		A
5	20105054	11420-F1-05		A
6	20105055	11420-F1-06		A
7	20105056	11420-F1-07		A
8	20105057	11420-F1-08		A
9	20105058	11420-F1-09		A
10	20105059	11420-F1-10		A
11	20105060	11420-F1-11		A
12	20105061	11420-F1-12		A
13	20105062	11420-F1-13		A
14	20105063	11420-F1-14		A
15	20105064	11420-F1-15		A
16	20105065	11420-F1-16		A
17	20105066	11420-F1-17		A
18	20105067	11420-F1-18		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Hilary Crumley		NVL	10/5/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:**

Date: 9/30/2020

Time: 9:38 AM

Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



<b>Company</b> EHS International	<b>NVL Batch Number</b> 2016319.00
<b>Address</b> 1011 SW Klickitat Way, Suite 104 Seattle, WA 98134	<b>TAT</b> 5 Days <b>AH</b> No
<b>Project Manager</b> Mr. David Braungardt	<b>Rush TAT</b>
<b>Phone</b> (206) 381-1128	<b>Due Date</b> 10/7/2020 <b>Time</b> 8:00 AM
<b>Cell</b> (206) 510-8305	<b>Email</b> davidb@ehsintl.com
	<b>Fax</b> (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
19	20105068	11420-F1-19		A
20	20105069	11420-F1-20		A
21	20105070	11420-F1-21		A
22	20105071	11420-F1-22		A
23	20105072	11420-F1-23		A
24	20105073	11420-F1-24		A
25	20105074	11420-F1-25		A
26	20105075	11420-F1-26		A
27	20105076	11420-F1-27		A
28	20105077	11420-F1-28		A
29	20105078	11420-F1-29		A
30	20105079	11420-F1-30		A
31	20105080	11420-F1-31		A
32	20105081	11420-F1-32		A
33	20105082	11420-F1-33		A
34	20105083	11420-F1-34		A
35	20105084	11420-F1-35		A
36	20105085	11420-F1-36		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Hilary Crumley		NVL	10/5/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:**

Date: 9/30/2020  
Time: 9:38 AM  
Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016319.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/7/2020 **Time** 8:00 AM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
37	20105086	11420-F1-37		A
38	20105087	11420-F1-38		A
39	20105088	11420-F1-39		A
40	20105089	11420-F1-40		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Hilary Crumley		NVL	10/5/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:**

Date: 9/30/2020  
 Time: 9:38 AM  
 Entered By: Kelly AuVu

2016319

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG**Client EHS International, Inc.Street 1011 SW Klickitat WaySuite 104Seattle, WA 98134Project Manager David BProject Location ARC SeaTac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

 Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny J @ehsintl.comJoel W @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other _____
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1	11420-F1-01			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15	11420-F1-40			

	Print Below	Sign Below	Company	Date	Time
Sampled by	<u>Sunny J</u>	<u>CO</u>	EHSI	9/28	8:00
Relinquished by	<u>Sunny J</u>	<u>CO</u>	EHSI	9/28	6:00pm
Received by	<u>Hlyguy</u>	<u>JZ</u>	<u>NW</u>	9/30/20	08:00
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results. Please include David, Sunny, Joel

October 6, 2020



David Braungardt  
EHS International  
1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2016320.00**

Client Project: 11420-01  
Location: ARC SeaTac City Hall

Dear Mr. Braungardt,

Enclosed please find test results for the 40 sample(s) submitted to our laboratory for analysis on 9/30/2020.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

A handwritten signature in black ink, appearing to read 'Matt Macfarlane'.

Matt Macfarlane, Asbestos Lab Supervisor



The logo for NVLAP (National Voluntary Laboratory Accreditation Program). It features the letters 'NVLAP' in a large, stylized, outlined font.

Lab Code: 102063-0

Enc.: Sample Results

**Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)**  
**4708 Aurora Avenue North | Seattle, WA 98103-6516**



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

**Lab ID: 20105090      Client Sample #: 11420-F1-41**

**Layer 1 of 1      Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Paint, Glass debris	Cellulose 40%
Fine particles	Glass fibers 50%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105091      Client Sample #: 11420-F1-42**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Paint, Glass debris	Cellulose 41%
Fine particles	Glass fibers 50%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105092      Client Sample #: 11420-F1-43**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Paint, Glass debris	Cellulose 42%
Fine particles	Glass fibers 50%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105093      Client Sample #: 11420-F1-44**

Location: ARC SeaTac City Hall

**Layer 1 of 4      Description:** Gray patterned looped fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles	Synthetic fibers 98%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 4</b>	<b>Description:</b> Dark gray rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	Glass fibers 16%		<b>None Detected ND</b>
		Cellulose 2%		
<b>Layer 3 of 4</b>	<b>Description:</b> Clear soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 4 of 4</b>	<b>Description:</b> Gray crumbly material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Fine grains	Cellulose 12%		<b>None Detected ND</b>

**Lab ID: 20105094**      **Client Sample #: 11420-F1-45**

Location: ARC SeaTac City Hall

<b>Layer 1 of 5</b>	<b>Description:</b> Dark gray looped fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 98%		<b>None Detected ND</b>
<b>Layer 2 of 5</b>	<b>Description:</b> Dark gray rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	Glass fibers 18%		<b>None Detected ND</b>
		Cellulose 2%		
<b>Layer 3 of 5</b>	<b>Description:</b> Clear soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 4 of 5</b>	<b>Description:</b> Gray crumbly material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Fine grains	Cellulose 14%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

<b>Layer 5 of 5</b>	<b>Description:</b> White compacted powdery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles	Cellulose 2%		<b>None Detected ND</b>

**Lab ID: 20105095**      **Client Sample #: 11420-F1-46**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray plastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Plastic, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Clear soft adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Debris, Wood flakes	Wood fibers 6%		<b>None Detected ND</b>
	Fine particles	Synthetic fibers 3%		

**Lab ID: 20105096**      **Client Sample #: 11420-F1-47**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray plastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Plastic, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Clear soft adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Debris, Wood flakes	Wood fibers 12%		<b>None Detected ND</b>
	Fine particles	Synthetic fibers 2%		

**Lab ID: 20105097**      **Client Sample #: 11420-F1-48**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

<b>Layer 1 of 1</b>	<b>Description:</b> Light brown soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105098**      **Client Sample #: 11420-F1-49**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Brown flat hard compressed fibrous vinyl with brown wood patterned covering			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles	Cellulose 62%		<b>None Detected ND</b>

<b>Layer 2 of 3</b>	<b>Description:</b> Brown soft adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Debris, Wood flakes	Wood fibers 8%		<b>None Detected ND</b>

<b>Layer 3 of 3</b>	<b>Description:</b> Light brown soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105099**      **Client Sample #: 11420-F1-50**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Brown flat hard compressed fibrous vinyl with gray patterned covering			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles	Cellulose 62%		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Light brown soft adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Debris, Wood flakes	Wood fibers 8%		<b>None Detected ND</b>

**Lab ID: 20105100**      **Client Sample #: 11420-F1-51**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 1 of 1</b>	<b>Description:</b> Red soft putty material with debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Putty Compound, Debris, Wood flakes	Wood fibers 8%		<b>None Detected ND</b>

---

**Lab ID: 20105101**      **Client Sample #: 11420-F1-52**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Light brown soft/elastic material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Caulking compound, Fine particles	Synthetic fibers 2%		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Paint, Calcareous binder, Calcareous particles	None Detected ND		<b>None Detected ND</b>

---

**Lab ID: 20105102**      **Client Sample #: 11420-F1-53**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Brown flat hard compressed fibrous vinyl with gray patterned covering			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles	Cellulose 60%		<b>None Detected ND</b>

<b>Layer 2 of 3</b>	<b>Description:</b> Red soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Wood flakes	Cellulose 3%		<b>None Detected ND</b>

<b>Layer 3 of 3</b>	<b>Description:</b> Light brown soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

---

**Lab ID: 20105103**      **Client Sample #: 11420-F1-54**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 1 of 3	Description: White compacted powdery material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Calcareous binder, Calcareous particles	None Detected ND	
Layer 2 of 3	Description: Red rubbery material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Rubber/Binder, Fine grains, Fine particles	Cellulose 2%	
Layer 3 of 3	Description: White chalky material with paper	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Gypsum/Binder, Fine particles	Cellulose 33%	
			Glass fibers 5%	

**Lab ID: 20105104**      **Client Sample #: 11420-F1-55**

Location: ARC SeaTac City Hall

Layer 1 of 1	Description: White brittle material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Gypsum particles, Perlite	Cellulose 4%	
		Fine particles		

**Lab ID: 20105105**      **Client Sample #: 11420-F1-56**

Location: ARC SeaTac City Hall

Layer 1 of 3	Description: White compacted powdery material with paint	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Paint, Calcareous binder, Calcareous particles	None Detected ND	
Layer 2 of 3	Description: White compacted powdery material with paint	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Paint, Calcareous binder, Calcareous particles	None Detected ND	

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 3 of 3</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Fine particles	Cellulose 29%		<b>None Detected ND</b>
		Glass fibers 6%		

**Lab ID: 20105106**      **Client Sample #: 11420-F1-57**

Location: ARC SeaTac City Hall

<b>Layer 1 of 4</b>	<b>Description:</b> White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Paint, Calcareous binder, Calcareous particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 4</b>	<b>Description:</b> White compacted powdery material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles	Cellulose 42%		<b>None Detected ND</b>
<b>Layer 3 of 4</b>	<b>Description:</b> White compacted powdery material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles	Cellulose 40%		<b>None Detected ND</b>
<b>Layer 4 of 4</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Fine particles	Cellulose 30%		<b>None Detected ND</b>
		Glass fibers 6%		

**Lab ID: 20105107**      **Client Sample #: 11420-F1-58**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> White chalky material with paper and paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Paint, Gypsum/Binder, Fine particles	Cellulose 32%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Glass fibers 9%

**Lab ID: 20105108 Client Sample #: 11420-F1-59**

Location: ARC SeaTac City Hall

**Layer 1 of 5 Description:** Dark gray and blue looped fibrous material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Plastic, Fine particles

Synthetic fibers 98%

**None Detected ND**

**Layer 2 of 5 Description:** Dark gray foamy material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Synthetic foam, Fine particles

None Detected ND

**None Detected ND**

**Layer 3 of 5 Description:** Light brown soft adhesive

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Adhesive/Binder, Fine particles

Cellulose 2%

**None Detected ND**

**Layer 4 of 5 Description:** White brittle material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Gypsum particles, Fine particles

Cellulose 10%

**None Detected ND**

**Layer 5 of 5 Description:** Light brown soft mastic

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Mastic/Binder, Fine particles

Synthetic fibers 3%

**None Detected ND**

**Lab ID: 20105109 Client Sample #: 11420-F1-60**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 6 Description:** Multicolored looped fibrous material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles

Synthetic fibers 98%

**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 6</b>	<b>Description:</b> Dark gray rubbery material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Rubber/Binder, Fine particles	Glass fibers 30%	<b>None Detected ND</b>
<b>Layer 3 of 6</b>	<b>Description:</b> Clear soft adhesive	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Adhesive/Binder, Debris, Fine particles	Synthetic fibers 3%	<b>None Detected ND</b>
<b>Layer 4 of 6</b>	<b>Description:</b> Black rubbery material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Rubber/Binder, Fine particles	None Detected ND	<b>None Detected ND</b>
<b>Layer 5 of 6</b>	<b>Description:</b> Light brown soft mastic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Mastic/Binder, Debris, Fine particles	None Detected ND	<b>None Detected ND</b>
<b>Layer 6 of 6</b>	<b>Description:</b> Gray cementitious material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Cement/Binder, Fine grains, Fine particles	None Detected ND	<b>None Detected ND</b>

**Lab ID: 20105110**      **Client Sample #: 11420-F1-61**

Location: ARC SeaTac City Hall

<b>Layer 1 of 5</b>	<b>Description:</b> Looped black fibrous material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Binder/Filler, Fine particles	Synthetic fibers 98%	<b>None Detected ND</b>
<b>Layer 2 of 5</b>	<b>Description:</b> Gray and blue rubbery material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Rubber/Binder, Fine particles	Glass fibers 15%	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 3 of 5</b>	<b>Description:</b> Light brown soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 4 of 5</b>	<b>Description:</b> Light brown soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles, Debris	None Detected ND		<b>None Detected ND</b>
<b>Layer 5 of 5</b>	<b>Description:</b> White brittle material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Gypsum particles, Fine particles	Cellulose 7%		<b>None Detected ND</b>

**Lab ID: 20105111** **Client Sample #: 11420-F1-62**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Black and gray looped fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 98%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Dark gray rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	Glass fibers 35%		<b>None Detected ND</b>

**Lab ID: 20105112** **Client Sample #: 11420-F1-63**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 2</b>	<b>Description:</b> Loose gray and tan crumbly material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	None Detected ND		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Layer 2 of 2**      **Description:** Gray crumbly material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine grains

Cellulose    2%

**None Detected ND**

**Lab ID: 20105113**      **Client Sample #: 11420-F1-64**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 3**      **Description:** Silver foil with fibrous mesh and thin red adhesive

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Metal foil, Adhesive/Binder, Fine particles

Glass fibers    40%

**None Detected ND**

**Layer 2 of 3**      **Description:** White compressed fibrous material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles

Cellulose    98%

**None Detected ND**

**Layer 3 of 3**      **Description:** Yellow fibrous material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles

Glass fibers    98%

**None Detected ND**

**Lab ID: 20105114**      **Client Sample #: 11420-F1-65**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** Gray crumbly putty material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Putty Compound, Fine grains, Debris

Cellulose    5%

**None Detected ND**

Fine particles

**Lab ID: 20105115**      **Client Sample #: 11420-F1-66**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 1</b>	<b>Description:</b> Gray soft putty material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Putty Compound, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105116**      **Client Sample #: 11420-F1-67**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Gray soft putty material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Putty Compound, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105117**      **Client Sample #: 11420-F1-68**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Red rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Rubber/Binder, Debris, Fine particles	Cellulose 3%		<b>None Detected ND</b>

**Lab ID: 20105118**      **Client Sample #: 11420-F1-69**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 4</b>	<b>Description:</b> Silver foil with fibrous mesh and thin red adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Metal foil, Adhesive/Binder, Fine particles	Glass fibers 40%		<b>None Detected ND</b>

<b>Layer 2 of 4</b>	<b>Description:</b> Off-white compressed fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Cellulose 98%		<b>None Detected ND</b>

<b>Layer 3 of 4</b>	<b>Description:</b> Black rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 4 of 4</b>	<b>Description:</b> Yellow fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Glass fibers 98%		<b>None Detected ND</b>

---

**Lab ID: 20105119**      **Client Sample #: 11420-F1-70**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Off-white soft putty material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Putty Compound, Fine particles, Debris	Talc fibers 5%		<b>None Detected ND</b>
		Wollastonite 2%		
		Synthetic fibers 2%		

---

**Lab ID: 20105120**      **Client Sample #: 11420-F1-71**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Blue brittle material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Debris, Fine particles	Wollastonite 5%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> White soft/elastic material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Caulking compound, Fine particles	None Detected ND		<b>None Detected ND</b>

---

**Lab ID: 20105121**      **Client Sample #: 11420-F1-72**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Black and blue soft plastic with sandy debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Plastic, Debris, Sand	Synthetic fibers 4%		<b>None Detected ND</b>
	Fine grains, Fine particles			

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Lab ID: 20105122 Client Sample #: 11420-F1-73**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Black rubbery fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%
Rubber/Binder, Fine particles	Synthetic fibers 30%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105123 Client Sample #: 11420-F1-74**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Black rubbery fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%
Rubber/Binder, Fine particles	Synthetic fibers 40%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105124 Client Sample #: 11420-F1-75**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Red rubbery material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Rubber/Binder, Debris, Fine particles	Cellulose 7%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105125 Client Sample #: 11420-F1-76**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Off-white soft putty material

Non-Fibrous Materials:	Other Fibrous Materials:%
Putty Compound, Fine particles, Debris	Talc fibers 6%
	Wollastonite 3%
	Synthetic fibers 3%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

---

**Lab ID: 20105126      Client Sample #: 11420-F1-77**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 2      Description:** Blue brittle material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles

Wollastonite 4%

**None Detected ND**

**Layer 2 of 2      Description:** White soft/elastic material with fibrous debris

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Caulking compound, Fine particles, Debris

Synthetic fibers 25%

**None Detected ND**

---

**Lab ID: 20105127      Client Sample #: 11420-F1-78**

Location: ARC SeaTac City Hall

**Layer 1 of 3      Description:** Silver foil with fibrous mesh and thin red adhesive

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Metal foil, Adhesive/Binder, Fine particles

Glass fibers 36%

**None Detected ND**

**Layer 2 of 3      Description:** Off-white compressed fibrous material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles

Cellulose 98%

**None Detected ND**

**Layer 3 of 3      Description:** Yellow fibrous material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles

Glass fibers 98%

**None Detected ND**

---

**Lab ID: 20105128      Client Sample #: 11420-F1-79**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Black plastic with debris

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Plastic, Debris, Fine particles

Cellulose 2%

**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016320.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Lab ID: 20105129**      **Client Sample #: 11420-F1-80**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** White soft/elastic material with debris

Non-Fibrous Materials:	Other Fibrous Materials: %
Caulking compound, Fine particles, Debris	None Detected    ND

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

# ASBESTOS LABORATORY SERVICES



<b>Company</b> EHS International	<b>NVL Batch Number</b> 2016320.00
<b>Address</b> 1011 SW Klickitat Way, Suite 104 Seattle, WA 98134	<b>TAT</b> 5 Days <b>AH</b> No
<b>Project Manager</b> Mr. David Braungardt	<b>Rush TAT</b>
<b>Phone</b> (206) 381-1128	<b>Due Date</b> 10/7/2020 <b>Time</b> 8:00 AM
<b>Cell</b> (206) 510-8305	<b>Email</b> davidb@ehsintl.com
	<b>Fax</b> (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	20105090	11420-F1-41		A
2	20105091	11420-F1-42		A
3	20105092	11420-F1-43		A
4	20105093	11420-F1-44		A
5	20105094	11420-F1-45		A
6	20105095	11420-F1-46		A
7	20105096	11420-F1-47		A
8	20105097	11420-F1-48		A
9	20105098	11420-F1-49		A
10	20105099	11420-F1-50		A
11	20105100	11420-F1-51		A
12	20105101	11420-F1-52		A
13	20105102	11420-F1-53		A
14	20105103	11420-F1-54		A
15	20105104	11420-F1-55		A
16	20105105	11420-F1-56		A
17	20105106	11420-F1-57		A
18	20105107	11420-F1-58		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Michael Jenkins		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:**

Date: 9/30/2020  
Time: 9:40 AM  
Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016320.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/7/2020 **Time** 8:00 AM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
19	20105108	11420-F1-59		A
20	20105109	11420-F1-60		A
21	20105110	11420-F1-61		A
22	20105111	11420-F1-62		A
23	20105112	11420-F1-63		A
24	20105113	11420-F1-64		A
25	20105114	11420-F1-65		A
26	20105115	11420-F1-66		A
27	20105116	11420-F1-67		A
28	20105117	11420-F1-68		A
29	20105118	11420-F1-69		A
30	20105119	11420-F1-70		A
31	20105120	11420-F1-71		A
32	20105121	11420-F1-72		A
33	20105122	11420-F1-73		A
34	20105123	11420-F1-74		A
35	20105124	11420-F1-75		A
36	20105125	11420-F1-76		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Michael Jenkins		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:**

Date: 9/30/2020  
 Time: 9:40 AM  
 Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016320.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/7/2020 **Time** 8:00 AM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
37	20105126	11420-F1-77		A
38	20105127	11420-F1-78		A
39	20105128	11420-F1-79		A
40	20105129	11420-F1-80		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Michael Jenkins		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:**

Date: 9/30/2020  
 Time: 9:40 AM  
 Entered By: Kelly AuVu



**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG****2016320****L A B S**  
HAZARDOUS MATERIALS SERVICES

**Client** EHS International, Inc.  
**Street** 1011 SW Klickitat Way  
 Suite 104  
 Seattle, WA 98134  
**Project Manager** David B  
**Project Location** APC Sretac City Hall

**NVL Batch Number** \_\_\_\_\_**Client Job Number** 11420-01**Total Samples** 39

**Turn Around Time** ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

**Email address** Sunny J @ehsintl.com

joel.w@ehsintl.com

**Phone:** (206) 381-1128 **Fax:** (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other _____
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

**Condition of Package:** ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1	11420-F1-41			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15	11420-F1-80			

	Print Below	Sign Below	Company	Date	Time
<b>Sampled by</b>	Sunny J	Sr	EHSI	9/28	8:00
<b>Relinquished by</b>	Sunny J	So	EHSI	9/28	6:00pm
<b>Received by</b>	Haley	[Signature]	[Signature]	9/30/20	0800B
<b>Analyzed by</b>					
<b>Results Called by</b>					
<b>Results Faxed by</b>					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results. Please include David, Sunny &amp; Joel

October 6, 2020



David Braungardt  
EHS International  
1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2016321.00**

Client Project: 11420-01  
Location: ARC SeaTac City Hall

Dear Mr. Braungardt,

Enclosed please find test results for the 40 sample(s) submitted to our laboratory for analysis on 9/30/2020.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

A handwritten signature in black ink, appearing to read 'Matt Macfarlane'.

Matt Macfarlane, Asbestos Lab Supervisor



The logo for NVLAP (National Voluntary Laboratory Accreditation Program). It features the letters 'NVLAP' in a large, stylized, black, outlined font.

Lab Code: 102063-0

Enc.: Sample Results

**Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)**  
**4708 Aurora Avenue North | Seattle, WA 98103-6516**



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Lab ID: 20105130 Client Sample #: 11420-F1-81**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** White soft material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Debris	Cellulose 4%
	Wollastonite 3%
	Talc fibers 2%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105131 Client Sample #: 11420-F1-82**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence. Insufficient material in layer 2 for further analysis.

**Layer 1 of 2 Description:** Red rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Mineral grains, Fine particles	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2 Description:** Trace white compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles, Paint	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105132 Client Sample #: 11420-F1-83**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Layer 1 of 2 Description:** Red rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Mineral grains, Fine particles	Cellulose <1%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2 Description:** Trace white compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles, Paint	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

---

**Lab ID: 20105133      Client Sample #: 11420-F1-84**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Layer 1 of 2      Description:** Thin white compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles, Paint	None Detected    ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2      Description:** Trace white compacted powdery material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles	Cellulose    47%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105134      Client Sample #: 11420-F1-85**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 3 for further analysis.

**Layer 1 of 3      Description:** Gray rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%
Vinyl/Binder, Fine particles	None Detected    ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 3      Description:** Off-white soft mastic

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder, Fine particles	None Detected    ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 3 of 3      Description:** Trace white compacted powdery material with paint and trace paper

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles, Paint	Cellulose    5%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105135      Client Sample #: 11420-F1-86**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence. Insufficient material in layer 3 for further analysis.

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 3</b>	<b>Description:</b> Black speckled beige vinyl tile			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 3</b>	<b>Description:</b> Thin yellow adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> Trace white compacted powdery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105136** **Client Sample #: 11420-F1-87**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Black speckled beige vinyl tile			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Thin yellow adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>

**Lab ID: 20105137** **Client Sample #: 11420-F1-88**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray woven fibrous material with gray soft backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 68%		<b>None Detected ND</b>
		Glass fibers 3%		

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 2 of 2</b>	<b>Description:</b> Thin yellow soft mastic with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles, Debris	Cellulose 2%		<b>None Detected ND</b>

---

**Lab ID: 20105138**      **Client Sample #: 11420-F1-89**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray woven fibrous material with gray soft backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 66%		<b>None Detected ND</b>
		Glass fibers 4%		

<b>Layer 2 of 2</b>	<b>Description:</b> Thin yellow soft mastic with thin clear material and debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>

---

**Lab ID: 20105139**      **Client Sample #: 11420-F1-90**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray rubbery material with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Off-white soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

---

**Lab ID: 20105140**      **Client Sample #: 11420-F1-91**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Beige vinyl material with tan woven fibrous material and thin yellow mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Fine particles	Cellulose 25%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

## Mastic/Binder

**Lab ID: 20105141**      **Client Sample #: 11420-F1-92**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 3**      **Description:** Beige vinyl material with tan woven fibrous material

Non-Fibrous Materials:      Other Fibrous Materials: %

Vinyl/Binder, Fine grains, Fine particles      Cellulose 27%

**Asbestos Type: %**

**None Detected ND**

**Layer 2 of 3**      **Description:** Brown crumbly material with yellow mastic

Non-Fibrous Materials:      Other Fibrous Materials: %

Binder/Filler, Mastic/Binder, Fine particles      Cellulose 6%

**Asbestos Type: %**

**None Detected ND**

**Layer 3 of 3**      **Description:** Thin black asphaltic mastic

Non-Fibrous Materials:      Other Fibrous Materials: %

Asphalt/Binder, Fine particles, Debris      Cellulose 2%

**Asbestos Type: %**

**Chrysotile 3%**

**Lab ID: 20105142**      **Client Sample #: 11420-F1-93**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** Beige crumbly material

Non-Fibrous Materials:      Other Fibrous Materials: %

Binder/Filler, Fine particles      None Detected ND

**Asbestos Type: %**

**None Detected ND**

**Lab ID: 20105143**      **Client Sample #: 11420-F1-94**

Location: ARC SeaTac City Hall

**Layer 1 of 2**      **Description:** White woven fibrous mesh with white paper and and foil with white mastic

Non-Fibrous Materials:      Other Fibrous Materials: %

Binder/Filler, Mastic/Binder, Metal foil      Cellulose 54%

Glass fibers 15%

**Asbestos Type: %**

**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow fibrous material with clear soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Adhesive/Binder, Glass debris	Glass fibers 93%		<b>None Detected ND</b>

**Lab ID: 20105144**      **Client Sample #: 11420-F1-95**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence. Insufficient material in layer 2 for further analysis.

<b>Layer 1 of 4</b>	<b>Description:</b> Black speckled beige vinyl tile			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 4</b>	<b>Description:</b> Trace tan soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 3 of 4</b>	<b>Description:</b> Beige vinyl with tan fibrous mesh and trace yellow mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Fine particles	Cellulose 24%		<b>None Detected ND</b>
	Mastic/Binder			

<b>Layer 4 of 4</b>	<b>Description:</b> Gray crumbly material with thin yellow mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Mastic/Binder	Cellulose 7%		<b>None Detected ND</b>

**Lab ID: 20105145**      **Client Sample #: 11420-F1-96**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Beige vinyl with tan fibrous mesh and trace tan mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Fine particles	Cellulose 26%		<b>None Detected ND</b>
	Mastic/Binder			

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 2</b>	<b>Description:</b> Gray crumbly material with thin tan mastic		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Mastic/Binder	Cellulose 6%	<b>None Detected ND</b>

**Lab ID: 20105146**      **Client Sample #: 11420-F1-97**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray ceramic tile		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Ceramic/Binder, Fine particles	None Detected ND	<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Thin white brittle material		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Fine particles	Cellulose <1%	<b>None Detected ND</b>

**Lab ID: 20105147**      **Client Sample #: 11420-F1-98**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray ceramic tile		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Ceramic/Binder, Fine particles	None Detected ND	<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> White brittle material with debris		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Fine particles	Cellulose 2%	<b>None Detected ND</b>
	Debris		

**Lab ID: 20105148**      **Client Sample #: 11420-F1-99**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Beige compressed fibrous material with paint		
	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
	Binder/Filler, Perlite, Glass debris	Cellulose 59%	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

Fine particles, Paint

Glass fibers 12%

**Lab ID: 20105149**      **Client Sample #: 11420-F1-100**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Perlite, Glass debris	Cellulose 62%
Fine particles, Paint	Glass fibers 11%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105150**      **Client Sample #: 11420-F1-101**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 4**      **Description:** Beige ceramic tile

Non-Fibrous Materials:	Other Fibrous Materials:%
Ceramic/Binder, Fine particles	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 4**      **Description:** Thin white brittle material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Mineral grains, Fine grains	Cellulose <1%
Debris	Hair <1%

**Asbestos Type: %**  
**None Detected ND**

**Layer 3 of 4**      **Description:** Beige brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Mineral grains, Fine grains	Cellulose <1%

**Asbestos Type: %**  
**None Detected ND**

**Layer 4 of 4**      **Description:** Dark green brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Mineral grains, Fine grains	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

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**Lab ID: 20105151      Client Sample #: 11420-F1-102**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** White woven fibrous material with white paper and thin white mastic with foil

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Mastic/Binder, Metal foil	Cellulose 59%
	Glass fibers 16%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2      Description:** Yellow fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Glass debris, Fine particles	Glass fibers 95%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105152      Client Sample #: 11420-F1-103**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Off-white soft elastic material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Debris	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105153      Client Sample #: 11420-F1-104**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 4      Description:** Beige ceramic tile

Non-Fibrous Materials:	Other Fibrous Materials:%
Ceramic/Binder, Fine particles	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 4      Description:** Red ceramic tile

Non-Fibrous Materials:	Other Fibrous Materials:%
Ceramic/Binder, Fine particles	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**  
Client Project #: 11420-01  
Date Received: 9/30/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

Layer 3 of 4	Description: White brittle material			Asbestos Type: % None Detected ND
	Non-Fibrous Materials:	Other Fibrous Materials:%		
	Binder/Filler, Mineral grains, Fine grains	Cellulose <1%		
Layer 4 of 4	Description: Beige brittle material with thin green brittle coating with debris			Asbestos Type: % None Detected ND
	Non-Fibrous Materials:	Other Fibrous Materials:%		
	Binder/Filler, Mineral grains, Fine grains	Cellulose <1%		
	Fine particles, Debris			

**Lab ID: 20105154**      **Client Sample #: 11420-F1-105**

Location: ARC SeaTac City Hall

Layer 1 of 1	Description: Red rubbery material			Asbestos Type: % None Detected ND
	Non-Fibrous Materials:	Other Fibrous Materials:%		
	Vinyl/Binder, Fine particles	Synthetic fibers	2%	

**Lab ID: 20105155**      **Client Sample #: 11420-F1-106**

Location: ARC SeaTac City Hall

Layer 1 of 1	Description: Off-white crumbly material with off-white fibrous material			Asbestos Type: % None Detected ND
	Non-Fibrous Materials:		Other Fibrous Materials:%	
	Binder/Filler, Fine grains, Fine particles		Cellulose 37%	
	Glass debris		Glass fibers 12%	

**Lab ID: 20105156**      **Client Sample #: 11420-F1-107**

Location: ARC SeaTac City Hall

Layer 1 of 1	Description: Off-white crumbly material with off-white fibrous material and paint			Asbestos Type: % None Detected ND
	Non-Fibrous Materials:		Other Fibrous Materials:%	
	Binder/Filler, Fine grains, Fine particles		Cellulose 29%	
	Glass debris, Paint		Glass fibers 14%	

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

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**Lab ID: 20105157      Client Sample #: 11420-F1-108**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** Pale pink compacted powdery material

Non-Fibrous Materials:	Other Fibrous Materials: %
Calcareous binder, Calcareous particles	Glass fibers    3%
	Cellulose    <1%

**Asbestos Type: %  
None Detected ND**

**Layer 2 of 2      Description:** White compacted powdery material with paper

Non-Fibrous Materials:	Other Fibrous Materials: %
Calcareous binder, Calcareous particles	Cellulose    39%

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105158      Client Sample #: 11420-F1-109**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Pale pink compacted powdery material

Non-Fibrous Materials:	Other Fibrous Materials: %
Calcareous binder, Calcareous particles	Glass fibers    4%

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105159      Client Sample #: 11420-F1-110**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Layer 1 of 2      Description:** Red soft material

Non-Fibrous Materials:	Other Fibrous Materials: %
Binder/Filler, Mineral grains, Fine particles	Glass fibers    3%

**Asbestos Type: %  
None Detected ND**

**Layer 2 of 2      Description:** Trace white compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials: %
Calcareous binder, Calcareous particles, Paint	None Detected    ND

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105160      Client Sample #: 11420-F1-111**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 2</b>	<b>Description:</b> Red soft material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Mineral grains, Fine particles	Glass fibers 3%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Trace white compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles, Paint	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105161**      **Client Sample #: 11420-F1-112**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Beige ceramic tile			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Ceramic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 3</b>	<b>Description:</b> Off-white soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> Beige brittle material with debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Mineral grains, Fine grains	Cellulose <1%		<b>None Detected ND</b>
	Fine particles, Debris			

**Lab ID: 20105162**      **Client Sample #: 11420-F1-113**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Off-white rubbery material with thin clear plastic and debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Plastic	Cellulose <1%		<b>None Detected ND</b>
	Debris			

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

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**Lab ID: 20105163      Client Sample #: 11420-F1-114**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 4</b>	<b>Description:</b> Beige ceramic tile	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Ceramic/Binder, Fine particles	None Detected ND	
<b>Layer 2 of 4</b>	<b>Description:</b> Thin off-white soft mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Mastic/Binder, Fine particles	None Detected ND	
<b>Layer 3 of 4</b>	<b>Description:</b> White cumbly/brittle material	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Binder/Filler, Mineral grains, Fine particles	Cellulose 2%	
<b>Layer 4 of 4</b>	<b>Description:</b> Beige brittle material with debris	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Binder/Filler, Fine grains, Mineral grains	Cellulose <1%	
		Fine particles, Debris		

---

**Lab ID: 20105164      Client Sample #: 11420-F1-115**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 4</b>	<b>Description:</b> White ceramic tile	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Ceramic/Binder, Fine particles	None Detected ND	
<b>Layer 2 of 4</b>	<b>Description:</b> Off-white soft mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Mastic/Binder, Fine particles	None Detected ND	

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 3 of 4</b>	<b>Description:</b> Thin white compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles, Paint	None Detected ND		<b>None Detected ND</b>
<b>Layer 4 of 4</b>	<b>Description:</b> Beige crumbly material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105165** **Client Sample #: 11420-F1-116**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 4</b>	<b>Description:</b> White ceramic tile			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Ceramic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 4</b>	<b>Description:</b> Off-white soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	Cellulose <1%		<b>None Detected ND</b>
<b>Layer 3 of 4</b>	<b>Description:</b> Thin white compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles, Paint	None Detected ND		<b>None Detected ND</b>
<b>Layer 4 of 4</b>	<b>Description:</b> Thin beige crumbly material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105166** **Client Sample #: 11420-F1-117**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 2</b>	<b>Description:</b> Dark blue woven fibrous material with soft gray backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 67%		<b>None Detected ND</b>
		Glass fibers 4%		

<b>Layer 2 of 2</b>	<b>Description:</b> Clear soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105167**      **Client Sample #: 11420-F1-118**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Dark blue woven fibrous material with soft gray backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 69%		<b>None Detected ND</b>
		Glass fibers 3%		

<b>Layer 2 of 2</b>	<b>Description:</b> Clear soft yellow adhesive with debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Debris	Cellulose <1%		<b>None Detected ND</b>
		Synthetic fibers <1%		

**Lab ID: 20105168**      **Client Sample #: 11420-F1-119**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Multicolored woven fibrous material with soft gray backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 65%		<b>None Detected ND</b>
		Glass fibers 5%		

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016321.00**

Client Project #: 11420-01

Date Received: 9/30/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Lab ID: 20105169**      **Client Sample #: 11420-F1-120**

Location: ARC SeaTac City Hall

**Layer 1 of 2**      **Description:** Multicolored woven fibrous material with soft gray backing

Non-Fibrous Materials:	Other Fibrous Materials: %
Binder/Filler, Fine particles	Synthetic fibers 65%
	Glass fibers 5%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2**      **Description:** Thin orange clear adhesive with debris

Non-Fibrous Materials:	Other Fibrous Materials: %
Adhesive/Binder, Fine particles, Debris	Cellulose <1%
	Synthetic fibers <1%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/06/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# ASBESTOS LABORATORY SERVICES



<b>Company</b> EHS International	<b>NVL Batch Number</b> 2016321.00
<b>Address</b> 1011 SW Klickitat Way, Suite 104 Seattle, WA 98134	<b>TAT</b> 5 Days <b>AH</b> No
<b>Project Manager</b> Mr. David Braungardt	<b>Rush TAT</b>
<b>Phone</b> (206) 381-1128	<b>Due Date</b> 10/7/2020 <b>Time</b> 8:00 AM
<b>Cell</b> (206) 510-8305	<b>Email</b> davidb@ehsintl.com
	<b>Fax</b> (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	20105130	11420-F1-81		A
2	20105131	11420-F1-82		A
3	20105132	11420-F1-83		A
4	20105133	11420-F1-84		A
5	20105134	11420-F1-85		A
6	20105135	11420-F1-86		A
7	20105136	11420-F1-87		A
8	20105137	11420-F1-88		A
9	20105138	11420-F1-89		A
10	20105139	11420-F1-90		A
11	20105140	11420-F1-91		A
12	20105141	11420-F1-92		A
13	20105142	11420-F1-93		A
14	20105143	11420-F1-94		A
15	20105144	11420-F1-95		A
16	20105145	11420-F1-96		A
17	20105146	11420-F1-97		A
18	20105147	11420-F1-98		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Hilary Crumley		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:**

Date: 9/30/2020  
Time: 9:41 AM  
Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016321.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/7/2020 **Time** 8:00 AM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
19	20105148	11420-F1-99		A
20	20105149	11420-F1-100		A
21	20105150	11420-F1-101		A
22	20105151	11420-F1-102		A
23	20105152	11420-F1-103		A
24	20105153	11420-F1-104		A
25	20105154	11420-F1-105		A
26	20105155	11420-F1-106		A
27	20105156	11420-F1-107		A
28	20105157	11420-F1-108		A
29	20105158	11420-F1-109		A
30	20105159	11420-F1-110		A
31	20105160	11420-F1-111		A
32	20105161	11420-F1-112		A
33	20105162	11420-F1-113		A
34	20105163	11420-F1-114		A
35	20105164	11420-F1-115		A
36	20105165	11420-F1-116		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Hilary Crumley		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:**

Date: 9/30/2020  
 Time: 9:41 AM  
 Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016321.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/7/2020 **Time** 8:00 AM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk  
**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40 **Rush Samples**

	Lab ID	Sample ID	Description	A/R
37	20105166	11420-F1-117		A
38	20105167	11420-F1-118		A
39	20105168	11420-F1-119		A
40	20105169	11420-F1-120		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	9/30/20	800
<b>Analyzed by</b>	Hilary Crumley		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:**

Date: 9/30/2020  
 Time: 9:41 AM  
 Entered By: Kelly AuVu

2016321

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG**Client EHS International, Inc.Street 1011 SW Klickitat WaySuite 104Seattle, WA 98134Project Manager David BProject Location ARC Seatac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01Total Samples 39
 Turn Around Time ☐ 1-Hr ☐ 2-Hrs ☐ 4-Hrs ☐ 24-Hrs ☐ 2 Days ☐ 3 Days ☐ 4 Days ☒ 5 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny J @ehsintl.comJoel W @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other _____
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1	11420-F1-81			
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15	11420-F1-120			

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny J	<i>[Signature]</i>	EHSI	9/1/08	6:00
Relinquished by	Sunny J	<i>[Signature]</i>	EHSI	9/25	6:00 pm
Received by	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	9/30/08	0800 DB
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results.

October 7, 2020



David Braungardt  
EHS International  
1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2016390.00**

Client Project: 11420-01  
Location: ARC SeaTac City Hall

Dear Mr. Braungardt,

Enclosed please find test results for the 40 sample(s) submitted to our laboratory for analysis on 10/1/2020.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

A handwritten signature in black ink, appearing to read 'Matt Macfarlane'.

Matt Macfarlane, Asbestos Lab Supervisor



The logo for NVLAP (National Voluntary Laboratory Accreditation Program). It consists of the letters 'NVLAP' in a large, stylized, black, outlined font.

Lab Code: 102063-0

Enc.: Sample Results

**Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)**  
**4708 Aurora Avenue North | Seattle, WA 98103-6516**



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Lab ID: 20105601 Client Sample #: 11420-F1-121**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Clear soft adhesive	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Adhesive/Binder, Fine particles	None Detected ND	
<b>Layer 2 of 3</b>	<b>Description:</b> Brown flat hard compressed vinyl with gray covering	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Vinyl/Binder, Fine particles	Cellulose 65%	
<b>Layer 3 of 3</b>	<b>Description:</b> Red soft adhesive with debris	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Adhesive/Binder, Debris, Fine particles	Wood fibers 6%	

**Lab ID: 20105602 Client Sample #: 11420-F1-122**

Location: ARC SeaTac City Hall

<b>Layer 1 of 4</b>	<b>Description:</b> Multicolored looped fibrous material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Binder/Filler, Fine particles	Synthetic fibers 98%	
<b>Layer 2 of 4</b>	<b>Description:</b> Gray rubbery material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Rubber/Binder, Fine particles	Glass fibers 14%	
<b>Layer 3 of 4</b>	<b>Description:</b> Light brown soft adhesive	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Adhesive/Binder, Debris, Fine particles	Synthetic fibers 3%	
<b>Layer 4 of 4</b>	<b>Description:</b> Light green brittle material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Binder/Filler, Fine particles	None Detected ND	

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Lab ID: 20105603      Client Sample #: 11420-F1-123**

Location: ARC SeaTac City Hall

<b>Layer 1 of 8</b>	<b>Description:</b> Multicolored looped fibrous material	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Binder/Filler, Fine particles	Synthetic fibers 98%	
<b>Layer 2 of 8</b>	<b>Description:</b> Gray rubbery material	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Rubber/Binder, Fine particles	Glass fibers 14%	
<b>Layer 3 of 8</b>	<b>Description:</b> Light brown soft adhesive	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Adhesive/Binder, Debris, Fine particles	None Detected ND	
<b>Layer 4 of 8</b>	<b>Description:</b> Gray crumbly sandy material	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Binder/Filler, Sand, Fine grains	Cellulose 15%	
		Fine particles		
<b>Layer 5 of 8</b>	<b>Description:</b> Blue rubbery material	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Rubber/Binder, Fine particles	None Detected ND	
<b>Layer 6 of 8</b>	<b>Description:</b> Light brown soft adhesive	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Adhesive/Binder, Debris, Fine particles	None Detected ND	
<b>Layer 7 of 8</b>	<b>Description:</b> Blue soft vinyl	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Vinyl/Binder, Fine particles	Cellulose 40%	

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 8 of 8</b>	<b>Description:</b> Brown fibrous mesh			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Cellulose 98%		<b>None Detected ND</b>

---

**Lab ID: 20105604**      **Client Sample #: 11420-F1-124**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Black asphaltic mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Asphalt/Binder, Debris, Fine particles	Cellulose 3%		<b>Chrysotile 6%</b>

---

**Lab ID: 20105605**      **Client Sample #: 11420-F1-125**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Blue rubbery material with debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Rubber/Binder, Debris, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Off-white soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Adhesive/Binder, Debris, Fine particles	Cellulose 2%		<b>None Detected ND</b>

---

**Lab ID: 20105606**      **Client Sample #: 11420-F1-126**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Blue rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Off-white soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Adhesive/Binder, Debris, Fine particles	Cellulose 2%		<b>None Detected ND</b>

---

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

---

**Lab ID: 20105607      Client Sample #: 11420-F1-127**

Location: ARC SeaTac City Hall

**Layer 1 of 4      Description:** White hard plastic

Non-Fibrous Materials:

Plastic, Fine particles

Other Fibrous Materials:%

None Detected    ND

**Asbestos Type: %**

**None Detected ND**

**Layer 2 of 4      Description:** White hard fibrous plastic

Non-Fibrous Materials:

Plastic, Fine particles

Other Fibrous Materials:%

Glass fibers    35%

**Asbestos Type: %**

**None Detected ND**

**Layer 3 of 4      Description:** Tan soft mastic

Non-Fibrous Materials:

Mastic/Binder, Fine particles

Other Fibrous Materials:%

None Detected    ND

**Asbestos Type: %**

**None Detected ND**

**Layer 4 of 4      Description:** White compacted powdery material with paint

Non-Fibrous Materials:

Paint, Calcareous binder, Calcareous particles

Other Fibrous Materials:%

None Detected    ND

**Asbestos Type: %**

**None Detected ND**

---

**Lab ID: 20105608      Client Sample #: 11420-F1-128**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Blue fibrous mesh with debris

Non-Fibrous Materials:

Binder/Filler, Debris, Wood flakes

Fine particles

Other Fibrous Materials:%

Synthetic fibers    98%

**Asbestos Type: %**

**None Detected ND**

---

**Lab ID: 20105609      Client Sample #: 11420-F1-129**

Location: ARC SeaTac City Hall

Comments:    Unable to separate mastics for analysis.

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

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<b>Layer 1 of 1</b>	<b>Description:</b> Black and brown asphaltic mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Asphalt/Binder, Mastic/Binder, Debris	Cellulose 5%		<b>Chrysotile 8%</b>
	Fine particles, Fine grains			

---

**Lab ID: 20105610**      **Client Sample #: 11420-F1-130**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> White soft crumbly material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Putty Compound, Paint, Debris	Cellulose 2%		<b>None Detected ND</b>
	Fine particles, Fine grains			

---

**Lab ID: 20105611**      **Client Sample #: 11420-F1-131**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Clear and light green brittle plastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Plastic, Fine particles	None Detected ND		<b>None Detected ND</b>

---

**Lab ID: 20105612**      **Client Sample #: 11420-F1-132**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> White soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Light brown compressed fibrous material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Paint, Binder/Filler, Fine particles	Wood fibers 92%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

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**Lab ID: 20105613      Client Sample #: 11420-F1-133**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Gray and light gray looped fibrous material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Binder/Filler, Fine particles	Synthetic fibers 98%	
<b>Layer 2 of 3</b>	<b>Description:</b> Gray rubbery material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Rubber/Binder, Fine particles	Glass fibers 27%	
<b>Layer 3 of 3</b>	<b>Description:</b> Clear soft adhesive	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Adhesive/Binder, Fine particles	None Detected ND	

---

**Lab ID: 20105614      Client Sample #: 11420-F1-134**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Beige ceramic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Ceramic/Binder, Fine particles	None Detected ND	
<b>Layer 2 of 3</b>	<b>Description:</b> White brittle material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Binder/Filler, Fine grains, Fine particles	None Detected ND	
<b>Layer 3 of 3</b>	<b>Description:</b> Gray brittle mastic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Mastic/Binder, Fine particles	Wollastonite 7%	

---

**Lab ID: 20105615      Client Sample #: 11420-F1-135**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 1 of 2	Description: Beige ceramic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Ceramic/Binder, Fine particles	None Detected ND	
Layer 2 of 2	Description: White brittle material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Binder/Filler, Fine grains, Fine particles	None Detected ND	

**Lab ID: 20105616**      **Client Sample #: 11420-F1-136**

Location: ARC SeaTac City Hall

Layer 1 of 3	Description: White ceramic with white glaze	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Ceramic/Binder, Fine grains, Fine particles	None Detected ND	
Layer 2 of 3	Description: White brittle material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Binder/Filler, Fine grains, Fine particles	None Detected ND	
Layer 3 of 3	Description: White compacted powdery material with paper & paint	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Paint, Calcareous binder, Calcareous particles	Cellulose 32%	

**Lab ID: 20105617**      **Client Sample #: 11420-F1-137**

Location: ARC SeaTac City Hall

Layer 1 of 3	Description: White ceramic with white glaze	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Ceramic/Binder, Fine grains, Fine particles	None Detected ND	
Layer 2 of 3	Description: White brittle material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Binder/Filler, Fine grains, Fine particles	None Detected ND	

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

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<b>Layer 3 of 3</b>	<b>Description:</b> White compacted powdery material with paper & paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Paint, Calcareous binder, Calcareous particles	Cellulose 36%		<b>None Detected ND</b>

---

**Lab ID: 20105618**      **Client Sample #: 11420-F2-138**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Paint, Calcareous binder, Calcareous particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Light gray chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Fine particles	Cellulose 31%		<b>None Detected ND</b>
		Glass fibers 5%		

---

**Lab ID: 20105619**      **Client Sample #: 11420-F2-139**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Paint, Calcareous binder, Calcareous particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Fine particles	Cellulose 32%		<b>None Detected ND</b>
		Glass fibers 6%		

---

**Lab ID: 20105620**      **Client Sample #: 11420-F2-140**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 1 of 4	<b>Description:</b> Thin white compacted powdery material with paint	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Paint, Calcareous binder, Calcareous particles	None Detected ND	
Layer 2 of 4	<b>Description:</b> White fibrous mesh with paint	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Binder/Filler, Paint, Fine particles	Synthetic fibers 98%	
Layer 3 of 4	<b>Description:</b> Tan brittle adhesive	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Adhesive/Binder, Fine particles	None Detected ND	
Layer 4 of 4	<b>Description:</b> White chalky material with paper	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Gypsum/Binder, Mica, Fine particles	Cellulose 32%	
			Glass fibers 8%	

**Lab ID: 20105621**      **Client Sample #: 11420-F2-141**

Location: ARC SeaTac City Hall

Layer 1 of 1	<b>Description:</b> White chalky material with paper and paint	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Paint, Gypsum/Binder, Fine particles	Cellulose 30%	
			Glass fibers 8%	

**Lab ID: 20105622**      **Client Sample #: 11420-F2-142**

Location: ARC SeaTac City Hall

Layer 1 of 2	<b>Description:</b> White compacted powdery material with paint	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Paint, Calcareous binder, Calcareous particles	Cellulose 3%	

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 2</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Mica, Fine particles	Cellulose 31%		<b>None Detected ND</b>
		Glass fibers 7%		

**Lab ID: 20105623**      **Client Sample #: 11420-F2-143**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> White compacted powdery material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles	Cellulose 25%		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Fine particles	Cellulose 32%		<b>None Detected ND</b>
		Glass fibers 7%		

**Lab ID: 20105624**      **Client Sample #: 11420-F2-144**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> White chalky material with paper			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Gypsum/Binder, Mica, Fine particles	Cellulose 31%		<b>None Detected ND</b>
		Glass fibers 8%		

**Lab ID: 20105625**      **Client Sample #: 11420-F2-145**

Location: ARC SeaTac City Hall

<b>Layer 1 of 4</b>	<b>Description:</b> Multicolored looped fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Synthetic fibers 98%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 4</b>	<b>Description:</b> Gray rubbery material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Rubber/Binder, Fine particles	Glass fibers 24%	<b>None Detected ND</b>
<b>Layer 3 of 4</b>	<b>Description:</b> Light brown soft adhesive	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Adhesive/Binder, Fine particles	Cellulose 2%	<b>None Detected ND</b>
<b>Layer 4 of 4</b>	<b>Description:</b> Loose white brittle vinyl	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Vinyl/Binder, Fine grains, Fine particles	None Detected ND	<b>Chrysotile 5%</b>

**Lab ID: 20105626** **Client Sample #: 11420-F2-146**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Brown rubbery material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Rubber/Binder, Fine particles	None Detected ND	<b>None Detected ND</b>
<b>Layer 2 of 3</b>	<b>Description:</b> Off-white soft adhesive	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Adhesive/Binder, Fine particles	None Detected ND	<b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> White compacted powdery material with paint	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Paint, Calcareous binder, Calcareous particles	Cellulose 4%	<b>None Detected ND</b>

**Lab ID: 20105627** **Client Sample #: 11420-F2-147**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Multicolored looped fibrous material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Binder/Filler, Fine particles	Synthetic fibers 98%	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

<b>Layer 2 of 2</b>	<b>Description:</b> Gray rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	Glass fibers 28%		<b>None Detected ND</b>

**Lab ID: 20105628**      **Client Sample #: 11420-F2-148**

Location: ARC SeaTac City Hall

<b>Layer 1 of 4</b>	<b>Description:</b> White soft adhesive with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Paint, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 2 of 4</b>	<b>Description:</b> Brown flat compressed fibrous material with light blue covering			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles	Cellulose 65%		<b>None Detected ND</b>

<b>Layer 3 of 4</b>	<b>Description:</b> Light red soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

<b>Layer 4 of 4</b>	<b>Description:</b> Brown compressed fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Cellulose 98%		<b>None Detected ND</b>

**Lab ID: 20105629**      **Client Sample #: 11420-F2-149**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Brown flat compressed fibrous material with light blue covering			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles, Debris	Cellulose 65%		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Light yellow soft adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles, Wood flakes	Wood fibers 5%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Date:** 10/06/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

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**Lab ID: 20105630      Client Sample #: 11420-F2-150**

Location: ARC SeaTac City Hall

**Layer 1 of 3      Description:** Brown rubbery material

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Rubber/Binder, Fine particles	None Detected ND	

**Layer 2 of 3      Description:** Light brown soft adhesive

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Adhesive/Binder, Fine particles	None Detected ND	

**Layer 3 of 3      Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Paint, Calcareous binder, Calcareous particles	None Detected ND	

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**Lab ID: 20105631      Client Sample #: 11420-F2-151**

Location: ARC SeaTac City Hall

**Layer 1 of 5      Description:** Light purple looped fibrous material with plastic mesh

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Binder/Filler, Plastic, Fine particles	Synthetic fibers 90%	

**Layer 2 of 5      Description:** Multicolored fibrous material

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Binder/Filler, Debris, Fine particles	Synthetic fibers 98%	

**Layer 3 of 5      Description:** Light brown brittle mastic

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Mastic/Binder, Fine particles	None Detected ND	

**Layer 4 of 5      Description:** White brittle vinyl

Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b> <b>Chrysotile 7%</b>
Vinyl/Binder, Fine grains, Fine particles	None Detected ND	

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

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<b>Layer 5 of 5</b>	<b>Description:</b> Black asphaltic mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Asphalt/Binder, Fine particles	Cellulose 5%		<b>Chrysotile 10%</b>

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**Lab ID: 20105632**      **Client Sample #: 11420-F2-152**

Location: ARC SeaTac City Hall

<b>Layer 1 of 4</b>	<b>Description:</b> White compacted powdery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Calcareous binder, Calcareous particles, Fine particles	Cellulose 2%		<b>None Detected ND</b>

<b>Layer 2 of 4</b>	<b>Description:</b> Light brown brittle mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	Synthetic fibers 3%		<b>None Detected ND</b>

<b>Layer 3 of 4</b>	<b>Description:</b> White brittle vinyl			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Fine particles	None Detected ND		<b>Chrysotile 7%</b>

<b>Layer 4 of 4</b>	<b>Description:</b> Black asphaltic mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Asphalt/Binder, Fine particles, Debris	Cellulose 4%		<b>Chrysotile 10%</b>
	Fine grains			

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**Lab ID: 20105633**      **Client Sample #: 11420-F2-153**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Tan rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 3</b>	<b>Description:</b> Beige soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected	ND	<b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Paint, Calcareous binder, Calcareous particles	None Detected	ND	<b>None Detected ND</b>

**Lab ID: 20105634**      **Client Sample #: 11420-F2-154**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Tan rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	None Detected	ND	<b>None Detected ND</b>
<b>Layer 2 of 3</b>	<b>Description:</b> Beige soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected	ND	<b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Paint, Calcareous binder, Calcareous particles	None Detected	ND	<b>None Detected ND</b>

**Lab ID: 20105635**      **Client Sample #: 11420-F2-155**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> White vinyl with fibrous debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine grains, Debris	Synthetic fibers	7%	<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Light brown soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected	ND	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Lab ID: 20105636 Client Sample #: 11420-F2-156**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Gray soft crumbly putty material

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
Putty Compound, Debris, Fine particles	Cellulose 3%	<b>None Detected ND</b>

**Lab ID: 20105637 Client Sample #: 11420-F2-157**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Gray soft crumbly putty material

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
Putty Compound, Debris, Fine particles	Cellulose 3%	<b>None Detected ND</b>

**Lab ID: 20105638 Client Sample #: 11420-F2-158**

Location: ARC SeaTac City Hall

**Layer 1 of 6 Description:** Gray patterned vinyl

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
Vinyl/Binder, Fine particles	None Detected ND	<b>None Detected ND</b>

**Layer 2 of 6 Description:** Gray fibrous backing

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
Binder/Filler, Fine particles	Cellulose 40%	<b>None Detected ND</b>
	Synthetic fibers 20%	
	Glass fibers 10%	

**Layer 3 of 6 Description:** White soft mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
Mastic/Binder, Fine particles	None Detected ND	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 4 of 6</b>	<b>Description:</b> Gray patterned vinyl			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 5 of 6</b>	<b>Description:</b> Gray fibrous backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Cellulose 42%		<b>None Detected ND</b>
		Synthetic fibers 20%		
		Glass fibers 11%		
<b>Layer 6 of 6</b>	<b>Description:</b> Light brown soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

**Lab ID: 20105639** **Client Sample #: 11420-F2-159**

Location: ARC SeaTac City Hall

<b>Layer 1 of 6</b>	<b>Description:</b> Gray patterned vinyl			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 6</b>	<b>Description:</b> Gray fibrous backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Cellulose 41%		<b>None Detected ND</b>
		Synthetic fibers 22%		
		Glass fibers 10%		
<b>Layer 3 of 6</b>	<b>Description:</b> White soft mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	None Detected ND		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016390.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 4 of 6</b>	<b>Description:</b> Gray patterned vinyl	Non-Fibrous Materials: Vinyl/Binder, Fine particles	Other Fibrous Materials:% None Detected ND	<b>Asbestos Type: %</b> <b>None Detected ND</b>
<b>Layer 5 of 6</b>	<b>Description:</b> Gray fibrous backing	Non-Fibrous Materials: Binder/Filler, Fine particles	Other Fibrous Materials:% Cellulose 42% Synthetic fibers 20% Glass fibers 9%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
<b>Layer 6 of 6</b>	<b>Description:</b> Light brown soft mastic	Non-Fibrous Materials: Mastic/Binder, Fine particles	Other Fibrous Materials:% None Detected ND	<b>Asbestos Type: %</b> <b>None Detected ND</b>

**Lab ID: 20105640** **Client Sample #: 11420-F2-160**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Tan rubbery material	Non-Fibrous Materials: Rubber/Binder, Fine particles	Other Fibrous Materials:% None Detected ND	<b>Asbestos Type: %</b> <b>None Detected ND</b>
<b>Layer 2 of 3</b>	<b>Description:</b> Light brown soft adhesive	Non-Fibrous Materials: Adhesive/Binder, Fine particles	Other Fibrous Materials:% None Detected ND	<b>Asbestos Type: %</b> <b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> Brown compressed fibrous material with paint	Non-Fibrous Materials: Paint, Binder/Filler, Fine particles	Other Fibrous Materials:% Cellulose 98%	<b>Asbestos Type: %</b> <b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Michael Jenkins

**Reviewed by:** Matt Macfarlane

**Date:** 10/06/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016390.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	20105601	11420-F1-121		A
2	20105602	11420-F1-122		A
3	20105603	11420-F1-123		A
4	20105604	11420-F1-124		A
5	20105605	11420-F1-125		A
6	20105606	11420-F1-126		A
7	20105607	11420-F1-127		A
8	20105608	11420-F1-128		A
9	20105609	11420-F1-129		A
10	20105610	11420-F1-130		A
11	20105611	11420-F1-131		A
12	20105612	11420-F1-132		A
13	20105613	11420-F1-133		A
14	20105614	11420-F1-134		A
15	20105615	11420-F1-135		A
16	20105616	11420-F1-136		A
17	20105617	11420-F1-137		A
18	20105618	11420-F2-138		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	Michael Jenkins		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 9:04 AM  
 Entered By: Kelly AuVu



# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016390.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
19	20105619	11420-F2-139		A
20	20105620	11420-F2-140		A
21	20105621	11420-F2-141		A
22	20105622	11420-F2-142		A
23	20105623	11420-F2-143		A
24	20105624	11420-F2-144		A
25	20105625	11420-F2-145		A
26	20105626	11420-F2-146		A
27	20105627	11420-F2-147		A
28	20105628	11420-F2-148		A
29	20105629	11420-F2-149		A
30	20105630	11420-F2-150		A
31	20105631	11420-F2-151		A
32	20105632	11420-F2-152		A
33	20105633	11420-F2-153		A
34	20105634	11420-F2-154		A
35	20105635	11420-F2-155		A
36	20105636	11420-F2-156		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	Michael Jenkins		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 9:04 AM  
 Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016390.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
37	20105637	11420-F2-157		A
38	20105638	11420-F2-158		A
39	20105639	11420-F2-159		A
40	20105640	11420-F2-160		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	Michael Jenkins		NVL	10/6/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 9:04 AM  
 Entered By: Kelly AuVu

**NVL Laboratories, Inc.**  
 4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

# CHAIN of CUSTODY SAMPLE LOG

# 2016390

Client EHS International, Inc.  
 Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
 Project Manager David B  
 Project Location MCC SeaTac City Hall

NVL Batch Number \_\_\_\_\_  
 Client Job Number 11420-01  
 Total Samples \_\_\_\_\_  
 Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs  
 Email address Sunny J @ehsintl.com  
Joel V @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>		<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Paint Chips in cm	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> All 8
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Mercury (Hg)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Other	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Selenium (Se)
		<input type="checkbox"/> Soil		<input type="checkbox"/> Chromium (Cr)	<input type="checkbox"/> Silver (Ag)
		<input type="checkbox"/> Paint Chips in %		<input type="checkbox"/> Lead (Pb)	<input type="checkbox"/> All 3
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify)		<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			<input type="checkbox"/> Nickel (Ni)
					<input type="checkbox"/> Zinc (Zn)

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-F1-121		
2		11420-F1-122		
3		11420-F1-123		
4		11420-F1-124		
5		11420-F1-125		
6		11420-F1-126		
7		11420-F1-127		
8		11420-F1-128		
9		11420-F1-129		
10		11420-F1-130		
11		11420-F1-131		
12		11420-F1-132		
13		11420-F1-133		
14		11420-F1-134		
15		11420-F1-135		

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny J	SJ	EHSI	4/30	4:00
Relinquished by	Sunny J	SJ	EHSI	4/30	5:00
Received by	Hilgery			10/14/20	0800 DJS
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results. Please include David, Sunny, Joel w/ results.

**NVL Laboratories, Inc.**  
4708 Aurora Ave N, Seattle, WA 98103  
Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

## CHAIN of CUSTODY SAMPLE LOG

# 2016390

L A B S  
PACIFIC NORTHWEST REGION

Client EHS International, Inc.  
Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
Project Manager David B  
Project Location ARC SeaTac City Hall

NVL Batch Number \_\_\_\_\_  
Client Job Number 11420-01

Total Samples \_\_\_\_\_  
Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs  
Email address Sunny J @ehsintl.com  
Joel W @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>					
<input type="checkbox"/> Total Metals	<input type="checkbox"/> Inst./Det Limit	<input type="checkbox"/> Matrix	<input type="checkbox"/> RCRA Metals	<input type="checkbox"/> All B	<input type="checkbox"/> Other Metals
<input type="checkbox"/> TCLP	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-F1-136		
2		11420-F1-137		
3		11420-F2-138		
4		11420-F2-139		
5		11420-F2-140		
6		11420-F2-141		
7		11420-F2-142		
8		11420-F2-143		
9		11420-F2-144		
10		11420-F2-145		
11		11420-F2-146		
12		11420-F2-147		
13		11420-F2-148		
14		11420-F2-149		
15		11420-F2-150		

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny J		EHSI	9/30	4:00
Relinquished by	Sunny J		EHSI	9/30	5:00
Received by				10/1/20	08:00
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results.

2016390

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG**Client EHS International, Inc.Street 1011 SW Klickitat WaySuite 104Seattle, WA 98134Project Manager David BProject Location ARC SeaTac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

 Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny T @ehsintl.comSoel n @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify)		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-F2-151		
2		11420-F2-152		
3		11420-F2-153		
4		11420-F2-154		
5		11420-F2-155		
6		11420-F2-156		
7		11420-F2-157		
8		11420-F2-158		
9		11420-F2-159		
10		11420-F2-160		
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	<u>Sunny T</u>	<u>gn</u>	<u>EHSI</u>	<u>9/30</u>	<u>4:00</u>
Relinquished by	<u>Sunny T</u>	<u>gn</u>	<u>EHSI</u>	<u>9/30</u>	<u>5:00</u>
Received by	<u>Hlyang</u>	<u>mm</u>	<u>mm</u>	<u>10/1/20</u>	<u>0800 DB</u>
Analyzed by					
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results.

October 7, 2020



David Braungardt  
EHS International  
1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2016419.00**

Client Project: 11420-01  
Location: ARC SeaTac City Hall

Dear Mr. Braungardt,

Enclosed please find test results for the 40 sample(s) submitted to our laboratory for analysis on 10/1/2020.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

A handwritten signature in black ink, appearing to read 'Nick Ly'.

Nick Ly, Technical Director



The logo for NVLAP (National Voluntary Laboratory Accreditation Program). It consists of the letters 'NVLAP' in a large, stylized, outlined font.

Lab Code: 102063-0

Enc.: Sample Results

**Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)**  
**4708 Aurora Avenue North | Seattle, WA 98103-6516**





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016419.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

---

**Lab ID: 20105897      Client Sample #: 11420-F2-161**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** Brown brittle material with pink laminate surface

Non-Fibrous Materials:	Other Fibrous Materials:%
Laminate/binder	Cellulose 25%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2      Description:** Soft green sticky adhesive

Non-Fibrous Materials:	Other Fibrous Materials:%
Adhesive/Binder	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105898      Client Sample #: 11420-F2-162**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Black rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%
Rubber/Binder	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105899      Client Sample #: 11420-F2-163**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Black rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%
Rubber/Binder, Fine grains, Fine particles	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105900      Client Sample #: 11420-F2-164**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 2      Description:** White brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Mineral grains, Fine grains	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016419.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 2 of 2</b>	<b>Description:</b> Beige crumbly fibrous material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Paint, Perlite	Cellulose 57%		<b>None Detected ND</b>
	Calcareous particles	Glass fibers 9%		

---

**Lab ID: 20105901**      **Client Sample #: 11420-F2-165**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Soft red sticky material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Cellulose 5%		<b>None Detected ND</b>

---

**Lab ID: 20105902**      **Client Sample #: 11420-F2-166**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Soft red sticky material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Fine particles	Cellulose 11%		<b>None Detected ND</b>

---

**Lab ID: 20105903**      **Client Sample #: 11420-F2-167**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Green soft material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Fine particles	Cellulose 2%		<b>None Detected ND</b>

---

**Lab ID: 20105904**      **Client Sample #: 11420-F2-168**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Green soft material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Fine particles	Cellulose 4%		<b>None Detected ND</b>

---

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016419.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

Organic debris, Miscellaneous particles

Hair <1%

**Lab ID: 20105905**      **Client Sample #: 11420-F2-169**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** Pink crumbly material

Non-Fibrous Materials:  
Binder/Filler, Glass beads, Fine particles

Other Fibrous Materials:%  
Glass fibers 7%  
Cellulose <1%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105906**      **Client Sample #: 11420-F2-170**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** Pink crumbly material

Non-Fibrous Materials:  
Binder/Filler, Glass beads, Fine particles

Other Fibrous Materials:%  
Glass fibers 4%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105907**      **Client Sample #: 11420-F2-171**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 3**      **Description:** Multicolored woven mesh with crumbly white mastic

Non-Fibrous Materials:  
Mastic/Binder, Fine particles

Other Fibrous Materials:%  
Synthetic fibers 75%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 3**      **Description:** Soft yellow mastic

Non-Fibrous Materials:  
Mastic/Binder

Other Fibrous Materials:%  
Cellulose <1%

**Asbestos Type: %**  
**None Detected ND**

**Layer 3 of 3**      **Description:** White compacted powdery material

Non-Fibrous Materials:  
Calcareous binder, Fine particles

Other Fibrous Materials:%  
Cellulose <1%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016419.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

**Lab ID: 20105908      Client Sample #: 11420-F2-172**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Multicolored woven mesh with crumbly white mastic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Mastic/Binder, Fine particles	Synthetic fibers 80%	
<b>Layer 2 of 2</b>	<b>Description:</b> Soft yellow mastic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Mastic/Binder	Cellulose <1%	

**None Detected ND**

**None Detected ND**

---

**Lab ID: 20105909      Client Sample #: 11420-F2-173**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 4</b>	<b>Description:</b> Grey vinyl tile	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Vinyl/Binder, Mineral grains	None Detected ND	
<b>Layer 2 of 4</b>	<b>Description:</b> Soft yellow mastic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Mastic/Binder, Miscellaneous particles, Fine particles	Cellulose 1%	
			Synthetic fibers <1%	
<b>Layer 3 of 4</b>	<b>Description:</b> White vinyl tile	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Vinyl/Binder, Mineral grains	None Detected ND	
<b>Layer 4 of 4</b>	<b>Description:</b> Soft black asphaltic mastic with red paint	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Asphalt/Binder, Paint	Cellulose 1%	

**None Detected ND**

**None Detected ND**

**None Detected ND**

**None Detected ND**

**Chrysotile 3%**

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016419.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

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**Lab ID: 20105910      Client Sample #: 11420-F2-174**

Location: ARC SeaTac City Hall

**Layer 1 of 4      Description:** Grey vinyl tile

Non-Fibrous Materials:

Other Fibrous Materials:%

**Asbestos Type: %**

Vinyl/Binder, Mineral grains

None Detected    ND

**None Detected ND**

**Layer 2 of 4      Description:** Soft yellow mastic

Non-Fibrous Materials:

Other Fibrous Materials:%

**Asbestos Type: %**

Mastic/Binder

None Detected    ND

**None Detected ND**

**Layer 3 of 4      Description:** White vinyl tile

Non-Fibrous Materials:

Other Fibrous Materials:%

**Asbestos Type: %**

Vinyl/Binder, Mineral grains

None Detected    ND

**None Detected ND**

**Layer 4 of 4      Description:** Soft black asphaltic mastic with red paint

Non-Fibrous Materials:

Other Fibrous Materials:%

**Asbestos Type: %**

Asphalt/Binder, Paint

None Detected    ND

**Chrysotile 4%**

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**Lab ID: 20105911      Client Sample #: 11420-F2-175**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Off-white crumbly material

Non-Fibrous Materials:

Other Fibrous Materials:%

**Asbestos Type: %**

Calcareous binder, Fine particles

Cellulose    6%

**None Detected ND**

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**Lab ID: 20105912      Client Sample #: 11420-F2-176**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Off-white crumbly material

Non-Fibrous Materials:

Other Fibrous Materials:%

**Asbestos Type: %**

Calcareous binder, Fine particles

Cellulose    16%

**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Date:** 10/07/2020

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

  
Nick Ly, Technical Director

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Method: EPA/600/R-93/116

**Lab ID: 20105913**      **Client Sample #: 11420-F2-177**

Location: ARC SeaTac City Hall

**Layer 1 of 1**      **Description:** Off-white crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Fine particles	Cellulose 15%
	Glass fibers 4%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105914**      **Client Sample #: 11420-F3-178**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 4**      **Description:** White vinyl tile

Non-Fibrous Materials:	Other Fibrous Materials:%
Vinyl/Binder, Mineral grains	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 4**      **Description:** Soft spongy black mastic

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 3 of 4**      **Description:** Crumbly yellow mastic

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Layer 4 of 4**      **Description:** Grey crumbly material

Non-Fibrous Materials:	Other Fibrous Materials:%
Cement/Binder, Fine grains, Mineral grains	Cellulose 2%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105915**      **Client Sample #: 11420-F3-179**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Nick Ly, Technical Director

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Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 4</b>	<b>Description:</b> White vinyl tile	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Vinyl/Binder, Mineral grains	None Detected ND	<b>None Detected ND</b>
<b>Layer 2 of 4</b>	<b>Description:</b> Soft spongy black mastic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Mastic/Binder	None Detected ND	<b>None Detected ND</b>
<b>Layer 3 of 4</b>	<b>Description:</b> Crumbly yellow mastic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Mastic/Binder	None Detected ND	<b>None Detected ND</b>
<b>Layer 4 of 4</b>	<b>Description:</b> Grey crumbly material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Cement/Binder, Fine grains, Mineral grains	Cellulose 1%	<b>None Detected ND</b>

**Lab ID: 20105916** **Client Sample #: 11420-F3-180**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Green crumbly material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Binder/Filler, Fine grains, Mineral grains	Cellulose 2%	<b>None Detected ND</b>

**Lab ID: 20105917** **Client Sample #: 11420-F3-181**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 2</b>	<b>Description:</b> Green crumbly material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Binder/Filler, Fine grains, Mineral grains	Glass fibers 1%	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

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Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

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<b>Layer 2 of 2</b>	<b>Description:</b> Loose yellow fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Fine particles, Glass debris	Glass fibers 99%		<b>None Detected ND</b>

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**Lab ID: 20105918**      **Client Sample #: 11420-F3-182**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Pink crumbly material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains	Glass fibers 5%		<b>None Detected ND</b>

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**Lab ID: 20105919**      **Client Sample #: 11420-F3-183**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Pink crumbly material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Calcareous particles	Glass fibers 8%		<b>None Detected ND</b>
	Miscellaneous particles	Cellulose 1%		

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**Lab ID: 20105920**      **Client Sample #: 11420-F3-184**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Soft red rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles, Fine grains	Glass fibers 4%		<b>None Detected ND</b>
		Cellulose 2%		

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**Lab ID: 20105921**      **Client Sample #: 11420-F3-185**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

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Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 1</b>	<b>Description:</b> Soft red rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles, Fine grains	Glass fibers	3%	<b>None Detected ND</b>
	Dust, Miscellaneous particles, Organic debris	Cellulose	1%	
		Hair	<1%	

**Lab ID: 20105922**      **Client Sample #: 11420-F3-186**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Off-white crumbly material with woven fibrous mesh			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Fine particles	Cellulose	18%	<b>None Detected ND</b>
		Glass fibers	1%	

**Lab ID: 20105923**      **Client Sample #: 11420-F3-187**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Off-white crumbly material with woven fibrous mesh			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Fine particles	Cellulose	26%	<b>None Detected ND</b>
		Glass fibers	1%	

**Lab ID: 20105924**      **Client Sample #: 11420-F3-188**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> White compacted powdery material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Calcareous binder, Paint	Cellulose	<1%	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

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Samples Analyzed: 40  
Method: EPA/600/R-93/116

Layer 2 of 3	Description: White compacted powdery material with paper	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Calcareous binder	Cellulose 35%	
Layer 3 of 3	Description: Chalky white material with paper	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Gypsum/Binder	Cellulose 14%	
			Glass fibers 2%	

**Lab ID: 20105925**      **Client Sample #: 11420-F3-189**

Location: ARC SeaTac City Hall

Layer 1 of 2	Description: White compacted powdery material with paint	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Calcareous binder, Paint	None Detected ND	
Layer 2 of 2	Description: Chalky white material with paper	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Gypsum/Binder	Cellulose 10%	
			Glass fibers 2%	

**Lab ID: 20105926**      **Client Sample #: 11420-F3-190**

Location: ARC SeaTac City Hall

Layer 1 of 1	Description: Off-white crumbly material with paint & woven mesh	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
		Calcareous binder, Paint, Fine particles	Cellulose 24%	

**Lab ID: 20105927**      **Client Sample #: 11420-F3-191**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

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Method: EPA/600/R-93/116

<b>Layer 1 of 4</b>	<b>Description:</b> Multicolored woven fibrous material with grey rubbery material	Non-Fibrous Materials: Rubber/Binder	Other Fibrous Materials:% Synthetic fibers 66%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
<b>Layer 2 of 4</b>	<b>Description:</b> Soft crumbly yellow mastic	Non-Fibrous Materials: Mastic/Binder	Other Fibrous Materials:% None Detected ND	<b>Asbestos Type: %</b> <b>None Detected ND</b>
<b>Layer 3 of 4</b>	<b>Description:</b> Soft green sticky adhesive	Non-Fibrous Materials: Adhesive/Binder	Other Fibrous Materials:% Synthetic fibers <1%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
<b>Layer 4 of 4</b>	<b>Description:</b> White compacted powdery material	Non-Fibrous Materials: Calcareous binder, Fine particles	Other Fibrous Materials:% None Detected ND	<b>Asbestos Type: %</b> <b>None Detected ND</b>

**Lab ID: 20105928**      **Client Sample #: 11420-F3-192**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Multicolored woven fibrous material with grey rubbery material	Non-Fibrous Materials: Rubber/Binder	Other Fibrous Materials:% Synthetic fibers 70%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Crumbly yellow mastic	Non-Fibrous Materials: Mastic/Binder	Other Fibrous Materials:% Synthetic fibers <1%	<b>Asbestos Type: %</b> <b>None Detected ND</b>

**Lab ID: 20105929**      **Client Sample #: 11420-F3-193**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Brown brittle material with green laminate surface	Non-Fibrous Materials: Laminate/binder	Other Fibrous Materials:% Cellulose 18%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
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**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

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Method: EPA/600/R-93/116

<b>Layer 2 of 2</b>	<b>Description:</b> Trace soft red sticky adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Fine particles	Cellulose <1%		<b>None Detected ND</b>

**Lab ID: 20105930**      **Client Sample #: 11420-F3-194**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Brown brittle material with green laminate surface			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Laminate/binder	Cellulose 25%		<b>None Detected ND</b>

<b>Layer 2 of 3</b>	<b>Description:</b> Soft red sticky adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder	Cellulose <1%		<b>None Detected ND</b>

<b>Layer 3 of 3</b>	<b>Description:</b> Tan fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler	Wood fibers 99%		<b>None Detected ND</b>

**Lab ID: 20105931**      **Client Sample #: 11420-F3-195**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Green woven fibrous material with grey rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	Synthetic fibers 60%		<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Soft clear sticky adhesive			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Calcareous particles, Fine particles	Synthetic fibers 2%		<b>None Detected ND</b>

**Lab ID: 20105932**      **Client Sample #: 11420-F3-196**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

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Method: EPA/600/R-93/116

<b>Layer 1 of 2</b>	<b>Description:</b> Green woven fibrous material with grey rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Rubber/Binder, Fine particles	Synthetic fibers 60%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Soft clear sticky adhesive with crumbly yellow mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Adhesive/Binder, Mastic/Binder, Fine particles	Synthetic fibers <1%		<b>None Detected ND</b>
	Fine grains, Cementitious particles			

**Lab ID: 20105933**      **Client Sample #: 11420-F3-197**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Tan fibrous material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Paint, Perlite	Cellulose 70%		<b>None Detected ND</b>
	Calcareous particles	Glass fibers 6%		

**Lab ID: 20105934**      **Client Sample #: 11420-F3-198**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Beige vinyl			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Vinyl/Binder	Cellulose 2%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Tan fibrous material with crumbly yellow mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder	Cellulose 81%		<b>None Detected ND</b>

**Lab ID: 20105935**      **Client Sample #: 11420-F3-199**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

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Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016419.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

<b>Layer 1 of 3</b>	<b>Description:</b> Beige vinyl	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Vinyl/Binder	Cellulose 4%	<b>None Detected ND</b>
<b>Layer 2 of 3</b>	<b>Description:</b> Tan fibrous material with crumbly yellow mastic	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Mastic/Binder	Cellulose 75%	<b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> Grey crumbly material	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Cement/Binder, Fine grains, Mineral grains	Cellulose 2%	<b>None Detected ND</b>

**Lab ID: 20105936**      **Client Sample #: 11420-F3-200**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Brown brittle material with grey laminate surface	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Laminate/binder	Cellulose 26%	<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Soft green sticky adhesive	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
		Adhesive/Binder	Cellulose <1%	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Matt Macfarlane

**Reviewed by:** Nick Ly

**Date:** 10/07/2020

**Date:** 10/07/2020

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016419.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	20105897	11420-F2-161		A
2	20105898	11420-F2-162		A
3	20105899	11420-F2-163		A
4	20105900	11420-F2-164		A
5	20105901	11420-F2-165		A
6	20105902	11420-F2-166		A
7	20105903	11420-F2-167		A
8	20105904	11420-F2-168		A
9	20105905	11420-F2-169		A
10	20105906	11420-F2-170		A
11	20105907	11420-F2-171		A
12	20105908	11420-F2-172		A
13	20105909	11420-F2-173		A
14	20105910	11420-F2-174		A
15	20105911	11420-F2-175		A
16	20105912	11420-F2-176		A
17	20105913	11420-F2-177		A
18	20105914	11420-F3-178		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	Matt Macfarlane		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 11:38 AM  
 Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
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**NVL Batch Number** 2016419.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
19	20105915	11420-F3-179		A
20	20105916	11420-F3-180		A
21	20105917	11420-F3-181		A
22	20105918	11420-F3-182		A
23	20105919	11420-F3-183		A
24	20105920	11420-F3-184		A
25	20105921	11420-F3-185		A
26	20105922	11420-F3-186		A
27	20105923	11420-F3-187		A
28	20105924	11420-F3-188		A
29	20105925	11420-F3-189		A
30	20105926	11420-F3-190		A
31	20105927	11420-F3-191		A
32	20105928	11420-F3-192		A
33	20105929	11420-F3-193		A
34	20105930	11420-F3-194		A
35	20105931	11420-F3-195		A
36	20105932	11420-F3-196		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	Matt Macfarlane		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
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**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
37	20105933	11420-F3-197		A
38	20105934	11420-F3-198		A
39	20105935	11420-F3-199		A
40	20105936	11420-F3-200		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	Matt Macfarlane		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 11:38 AM  
 Entered By: Kelly AuVu

2016419

## NVL Laboratories, Inc.

4708 Aurora Ave N, Seattle, WA 98103

Tel: 206.547.0100 Emerg. Pager: 206.344.1878

Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

CHAIN of CUSTODY  
SAMPLE LOGClient EHS International, Inc.Street 1011 SW Klickitat Way  
Suite 104Seattle, WA 98134Project Manager David BProject Location ARC Seattle City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny J @ehsintl.comJoel W @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other																																				
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk																																					
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration																																						
<table border="1"> <tr> <th>METALS</th> <th>Inst./Det Limit</th> <th>Matrix</th> <th>RCRA Metals</th> <th>All 8</th> <th>Other Metals</th> </tr> <tr> <td><input type="checkbox"/> Total Metals</td> <td><input type="checkbox"/> FAA (ppm)</td> <td><input type="checkbox"/> Air Filter</td> <td><input type="checkbox"/> Paint Chips in cm</td> <td><input type="checkbox"/> Arsenic (As)</td> <td><input type="checkbox"/> All 3</td> </tr> <tr> <td><input type="checkbox"/> TCLP</td> <td><input type="checkbox"/> ICP (ppm)</td> <td><input type="checkbox"/> Drinking water</td> <td><input type="checkbox"/> Waste Water</td> <td><input type="checkbox"/> Barium (Ba)</td> <td><input type="checkbox"/> Copper (Cu)</td> </tr> <tr> <td></td> <td><input type="checkbox"/> GFAA (ppb)</td> <td><input type="checkbox"/> Dust/wipe (Area)</td> <td><input type="checkbox"/> Other</td> <td><input type="checkbox"/> Cadmium (Cd)</td> <td><input type="checkbox"/> Nickel (Ni)</td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Soil</td> <td></td> <td><input type="checkbox"/> Chromium (Cr)</td> <td><input type="checkbox"/> Zinc (Zn)</td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Paint Chips in %</td> <td></td> <td><input type="checkbox"/> Lead (Pb)</td> <td></td> </tr> </table>						METALS	Inst./Det Limit	Matrix	RCRA Metals	All 8	Other Metals	<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Paint Chips in cm	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> All 3	<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Copper (Cu)		<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Other	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Nickel (Ni)			<input type="checkbox"/> Soil		<input type="checkbox"/> Chromium (Cr)	<input type="checkbox"/> Zinc (Zn)			<input type="checkbox"/> Paint Chips in %		<input type="checkbox"/> Lead (Pb)	
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<input type="checkbox"/> Other Types of Analysis <input type="checkbox"/> Fiberglass <input type="checkbox"/> Nuisance Dust <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Silica <input type="checkbox"/> Respirable Dust																																									

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g. Sample area, Sample Volume, etc)	A/R
1		11420-F2-161		
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15		11420-F2-175		

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny J	S	EHSI	9/30	8:00
Relinquished by	Sunny J	S	EHSI	9/30	4:00
Received by	Hilary	JL		10/1/20	0800DB
Analyzed by					
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results. Please include David, Sunny, Joel w/ results



2016419

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG**Client EHS International, Inc.Street 1011 SW Klickitat WaySuite 104Seattle, WA 98134Project Manager David BProject Location ARC Seattle City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

 Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny J @ehsintl.comJoel V @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-F2-176		
2		11420-F2-177		
3		11420-F3-178		
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15		11420-F3-190		

	Print Below	Sign Below	Company	Date	Time
Sampled by	<u>Sunny J</u>	<u>S</u>	<u>EHSI</u>	<u>9/30</u>	<u>8:20</u>
Relinquished by	<u>Sunny J</u>	<u>S</u>	<u>EHSI</u>	<u>9/30</u>	<u>4:00</u>
Received by	<u>Wiley</u>	<u>W</u>	<u>W</u>	<u>10/1/20</u>	<u>0800 PD</u>
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results.

2016419

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG**

Client EHS International, Inc.  
 Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
 Project Manager David B  
 Project Location APC SeaTac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny T @ehsintl.comJocelyn @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
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		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify)		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-F3-191		
2				
3				
4				
5				
6				
7				
8				
9				
10		11420-F3-200		
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	<u>Sunny T</u>	<u>[Signature]</u>	<u>EHSI</u>	<u>9/30</u>	<u>8:10</u>
Relinquished by	<u>Sunny T</u>	<u>[Signature]</u>	<u>EHSI</u>	<u>9/30</u>	<u>11:20</u>
Received by	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>10/1/20</u>	<u>0800DB</u>
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results.

October 8, 2020



David Braungardt  
EHS International  
1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2016420.00**

Client Project: 11420-01  
Location: ARC SeaTac City Hall

Dear Mr. Braungardt,

Enclosed please find test results for the 40 sample(s) submitted to our laboratory for analysis on 10/1/2020.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

A handwritten signature in black ink, appearing to read 'Matt Macfarlane'.

Matt Macfarlane, Asbestos Lab Supervisor



The logo for NVLAP (National Voluntary Laboratory Accreditation Program). It features the letters 'NVLAP' in a large, stylized, outlined font.

Lab Code: 102063-0

Enc.: Sample Results

**Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)**  
**4708 Aurora Avenue North | Seattle, WA 98103-6516**



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

**Lab ID: 20105937      Client Sample #: 11420-F3-201**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** Brown flat hard compressed fibrous material with gray surface

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Laminate/binder, Fine particles	Cellulose 81%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2      Description:** Green firm sticky mastic

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder, Fine particles, Wood flakes	Cellulose 8%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105938      Client Sample #: 11420-F3-202**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** White chalky material with paper and paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Paint	Glass fibers 3%
Fine grains	

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105939      Client Sample #: 11420-F3-203**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Beige compressed fibrous material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Foamed glass, Glass beads	Cellulose 43%
Paint, Fine particles	Glass fibers 25%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105940      Client Sample #: 11420-F3-204**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

---

<b>Layer 1 of 1</b>	<b>Description:</b> White brittle material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Paint, Fine particles	Glass fibers 2%		<b>None Detected ND</b>

---

**Lab ID: 20105941**      **Client Sample #: 11420-F3-205**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> White brittle material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Paint, Fine particles	Glass fibers 2%		<b>None Detected ND</b>

---

**Lab ID: 20105942**      **Client Sample #: 11420-F3-206**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Brown flat hard compressed fibrous material with gray surface			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Laminate/binder, Fine particles	Cellulose 84%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Off-white firm mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Wood flakes, Fine particles	Cellulose 6%		<b>None Detected ND</b>
	Calcareous particles			

---

**Lab ID: 20105943**      **Client Sample #: 11420-F3-207**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Brown flat hard compressed fibrous material with gray surface			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Laminate/binder, Fine particles	Cellulose 81%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Off-white firm mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Wood flakes, Fine particles	Cellulose 10%		<b>None Detected ND</b>

---

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

## Calcareous particles

**Lab ID: 20105944**      **Client Sample #: 11420-F3-208**

Location: ARC SeaTac City Hall

**Layer 1 of 2**      **Description:** White compacted powdery material with paint

Non-Fibrous Materials:	Other Fibrous Materials:%
Calcareous binder, Calcareous particles, Paint	Cellulose 2%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2**      **Description:** White chalky material with paper

Non-Fibrous Materials:	Other Fibrous Materials:%
Gypsum/Binder, Fine particles	Cellulose 17%
	Glass fibers 2%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105945**      **Client Sample #: 11420-F3-209**

Location: ARC SeaTac City Hall

**Layer 1 of 3**      **Description:** Off-white fibrous material with yellow firm mastic and paper

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder, Fine particles, Plastic	Synthetic fibers 62%
Fine grains, Organic debris	Glass fibers 11%
	Cellulose 4%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 3**      **Description:** Gray fibrous material with trace mastic

Non-Fibrous Materials:	Other Fibrous Materials:%
Fine particles, Mastic/Binder	Synthetic fibers 89%

**Asbestos Type: %**  
**None Detected ND**

**Layer 3 of 3**      **Description:** Yellow mastic with brown fibers

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder, Fine particles, Calcareous particles	Cellulose 17%
Wood flakes	Synthetic fibers 5%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

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**Lab ID: 20105946      Client Sample #: 11420-F3-210**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** Off-white fibrous material with yellow firm mastic and paper

Non-Fibrous Materials:	Other Fibrous Materials:%
Mastic/Binder, Fine particles, Plastic	Synthetic fibers 54%
Fine grains, Calcareous particles	Glass fibers 9%
	Cellulose 4%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2      Description:** Gray fibrous material with yellow mastic

Non-Fibrous Materials:	Other Fibrous Materials:%
Fine particles, Mastic/Binder, Calcareous particles	Synthetic fibers 81%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105947      Client Sample #: 11420-F3-211**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** Gray firm material

Non-Fibrous Materials:	Other Fibrous Materials:%
Teflon, Binder/Filler, Fine particles	Wollastonite 5%
	Cellulose 2%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2      Description:** Gray brittle material with mineral grains

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Mineral grains, Fine grains	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20105948      Client Sample #: 11420-F2-212**

Location: ARC SeaTac City Hall

**Layer 1 of 2      Description:** Brown fibrous material with brown rubbery backing

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Vinyl/Binder, Fine particles	Synthetic fibers 52%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

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Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow firm mastic  Non-Fibrous Materials: Mastic/Binder, Fine particles, Calcareous binder	Glass fibers	4%	<b>Asbestos Type: %</b>  <b>None Detected ND</b>
		Other Fibrous Materials:	%	
		Synthetic fibers	6%	
		Cellulose	5%	
		Glass fibers	3%	

**Lab ID: 20105949**      **Client Sample #: 11420-F2-213**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Brown fibrous material with brown rubbery backing  Non-Fibrous Materials: Binder/Filler, Vinyl/Binder, Fine particles	Other Fibrous Materials:	%	<b>Asbestos Type: %</b>  <b>None Detected ND</b>
		Synthetic fibers	50%	
		Glass fibers	5%	
		Cellulose	3%	
<b>Layer 2 of 2</b>	<b>Description:</b> Yellow firm mastic  Non-Fibrous Materials: Mastic/Binder, Fine particles, Calcareous binder	Other Fibrous Materials:	%	<b>Asbestos Type: %</b>  <b>None Detected ND</b>
		Cellulose	7%	
		Synthetic fibers	6%	
		Glass fibers	3%	

**Lab ID: 20105950**      **Client Sample #: 11420-F2-214**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Green fibrous material with white hard mastic and wood  Non-Fibrous Materials: Mastic/Binder, Wood flakes, Plastic Fine particles, Calcareous particles	Other Fibrous Materials:	%	<b>Asbestos Type: %</b>  <b>None Detected ND</b>
		Synthetic fibers	68%	
		Cellulose	19%	

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

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**Lab ID: 20105951      Client Sample #: 11420-F2-215**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Green fibrous material with white hard mastic and wood

Non-Fibrous Materials:	Other Fibrous Materials: %
Mastic/Binder, Wood flakes, Plastic	Synthetic fibers 68%
Fine particles, Calcareous particles	Cellulose 19%

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105952      Client Sample #: 11420-F2-216**

Location: ARC SeaTac City Hall

**Layer 1 of 4      Description:** Gray vinyl tile with off-white surface

Non-Fibrous Materials:	Other Fibrous Materials: %
Vinyl/Binder, Fine particles, Calcareous particles	Cellulose 2%

**Asbestos Type: %  
None Detected ND**

**Layer 2 of 4      Description:** Colorless soft sticky mastic

Non-Fibrous Materials:	Other Fibrous Materials: %
Mastic/Binder, Fine particles	Synthetic fibers 4%
	Cellulose 2%

**Asbestos Type: %  
None Detected ND**

**Layer 3 of 4      Description:** Yellow firm mastic

Non-Fibrous Materials:	Other Fibrous Materials: %
Mastic/Binder, Calcareous particles, Fine particles	Cellulose 3%
	Synthetic fibers 3%

**Asbestos Type: %  
None Detected ND**

**Layer 4 of 4      Description:** Gray brittle material with mineral grains

Non-Fibrous Materials:	Other Fibrous Materials: %
Binder/Filler, Mineral grains, Fine particles	None Detected ND

**Asbestos Type: %  
None Detected ND**

---

**Lab ID: 20105953      Client Sample #: 11420-F2-217**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 1 of 3</b>	<b>Description:</b> Gray vinyl tile with off-white surface			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Vinyl/Binder, Fine particles, Calcareous particles	None Detected ND		<b>None Detected ND</b>
<b>Layer 2 of 3</b>	<b>Description:</b> Colorless soft sticky mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles, Wood flakes	Cellulose 4%		<b>None Detected ND</b>
<b>Layer 3 of 3</b>	<b>Description:</b> Yellow firm mastic			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Calcareous particles, Fine particles	Cellulose 4%		<b>None Detected ND</b>
	Wood flakes	Synthetic fibers 2%		

**Lab ID: 20105954** **Client Sample #: 11420-F2-218**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Brown flat hard compressed fibrous material with green surface			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Laminate/binder, Fine particles	Cellulose 82%		<b>None Detected ND</b>
<b>Layer 2 of 2</b>	<b>Description:</b> Green firm sticky mastic with wood flakes			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Mastic/Binder, Wood flakes, Fine particles	Cellulose 13%		<b>None Detected ND</b>

**Lab ID: 20105955** **Client Sample #: 11420-F2-219**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> White firm material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Caulking compound, Paint, Calcareous particles	Cellulose 2%		<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

<b>Layer 2 of 3</b>	<b>Description:</b> Brown flat hard compressed fibrous material with green surface	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Binder/Filler, Laminate/binder, Fine particles	Cellulose 80%	<b>None Detected ND</b>

<b>Layer 3 of 3</b>	<b>Description:</b> Green firm sticky mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Mastic/Binder, Fine particles	Cellulose 6%	<b>None Detected ND</b>

**Lab ID: 20105956**      **Client Sample #: 11420-F2-220**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Pink vinyl tile	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Vinyl/Binder, Calcareous particles	None Detected ND	<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow firm mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Mastic/Binder, Fine grains, Fine particles	Cellulose 5%	<b>None Detected ND</b>

**Lab ID: 20105957**      **Client Sample #: 11420-F2-221**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Pink vinyl tile	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Vinyl/Binder, Calcareous particles	None Detected ND	<b>None Detected ND</b>

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow firm mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b>
		Mastic/Binder, Fine grains, Fine particles	Cellulose 6%	<b>None Detected ND</b>
			Synthetic fibers 2%	

**Lab ID: 20105958**      **Client Sample #: 11420-F2-222**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

<b>Layer 1 of 2</b>	<b>Description:</b> Gray fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Mastic/Binder, Fine particles	Synthetic fibers 54%		<b>None Detected ND</b>
		Glass fibers 9%		
		Cellulose 5%		

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow firm mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Calcareous particles, Fine grains	Synthetic fibers 6%		<b>None Detected ND</b>
		Cellulose 3%		

**Lab ID: 20105959**      **Client Sample #: 11420-F2-223**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Gray fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Mastic/Binder, Fine particles	Synthetic fibers 58%		<b>None Detected ND</b>
		Glass fibers 10%		
		Cellulose 3%		

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow firm mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Calcareous particles, Fine grains	Cellulose 6%		<b>None Detected ND</b>
		Synthetic fibers 3%		

**Lab ID: 20105960**      **Client Sample #: 11420-F2-224**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

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# Bulk Asbestos Fibers Analysis

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**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 1 of 2	Description: Black rubbery material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Vinyl/Binder	None Detected ND	
Layer 2 of 2	Description: White hard mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Mastic/Binder, Calcareous particles, Fine particles	Cellulose 2%	

**Lab ID: 20105961 Client Sample #: 11420-F2-225**

Location: ARC SeaTac City Hall

Layer 1 of 2	Description: Black rubbery material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Vinyl/Binder	None Detected ND	
Layer 2 of 2	Description: White hard mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Mastic/Binder, Calcareous particles, Fine particles	Cellulose 3%	
		Organic debris, Insect parts		

**Lab ID: 20105962 Client Sample #: 11420-F2-226**

Location: ARC SeaTac City Hall

Layer 1 of 2	Description: Brown fibrous material with white hard mastic and woven backing	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Mastic/Binder, Fine grains, Fine particles	Synthetic fibers 59%	
		Calcareous particles	Cellulose 14%	
Layer 2 of 2	Description: Yellow firm mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
		Mastic/Binder, Fine particles	Cellulose 8%	

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

**Lab ID: 20105963 Client Sample #: 11420-F2-227**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Black foamy material with colorless sticky mastic

Non-Fibrous Materials:	Other Fibrous Materials: %
Synthetic foam, Mastic/Binder, Fine particles	Cellulose 2%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105964 Client Sample #: 11420-F2-228**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Black foamy material with colorless sticky mastic

Non-Fibrous Materials:	Other Fibrous Materials: %
Synthetic foam, Mastic/Binder, Fine particles	Synthetic fibers 2%
	Cellulose 2%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105965 Client Sample #: 11420-F2-229**

Location: ARC SeaTac City Hall

**Layer 1 of 2 Description:** Brown flat hard compressed fibrous material with blue surface

Non-Fibrous Materials:	Other Fibrous Materials: %
Binder/Filler, Laminate/binder	Cellulose 79%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2 Description:** Yellow firm mastic

Non-Fibrous Materials:	Other Fibrous Materials: %
Mastic/Binder, Fine particles, Wood flakes	Cellulose 6%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20105966 Client Sample #: 11420-F2-230**

Location: ARC SeaTac City Hall

**Layer 1 of 2 Description:** Brown flat hard compressed fibrous material with blue surface

Non-Fibrous Materials:	Other Fibrous Materials: %
Binder/Filler, Laminate/binder	Cellulose 82%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow firm mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles, Wood flakes	Cellulose 15%		<b>None Detected ND</b>

**Lab ID: 20105967**      **Client Sample #: 11420-F2-231**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Gray fibrous material with white hard mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Calcareous particles, Fine particles	Synthetic fibers 73%		<b>None Detected ND</b>
	Plastic, Fine grains	Cellulose 3%		

<b>Layer 2 of 3</b>	<b>Description:</b> Gray fibrous material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Fine particles, Plastic	Cellulose 86%		<b>None Detected ND</b>

<b>Layer 3 of 3</b>	<b>Description:</b> Yellow firm mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine particles	Cellulose 12%		<b>None Detected ND</b>
	Wood flakes	Cellulose 4%		

**Lab ID: 20105968**      **Client Sample #: 11420-F2-232**

Location: ARC SeaTac City Hall

<b>Layer 1 of 3</b>	<b>Description:</b> Gray fibrous material with white hard mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Calcareous particles, Fine particles	Synthetic fibers 79%		<b>None Detected ND</b>
	Plastic, Fine grains	Cellulose 3%		

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 2 of 3	Description: Gray fibrous material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Fine particles, Plastic	Cellulose 89%	
Layer 3 of 3	Description: Yellow firm mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Mastic/Binder, Fine particles	Cellulose 16%	
		Wood flakes	Synthetic fibers 3%	

**Lab ID: 20105969**      **Client Sample #: 11420-F2-233**

Location: ARC SeaTac City Hall

Layer 1 of 3	Description: Gray vinyl tile with white surface	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Vinyl/Binder, Calcareous particles	None Detected ND	
Layer 2 of 3	Description: Colorless soft sticky mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Mastic/Binder, Fine particles	Cellulose 3%	
Layer 3 of 3	Description: Yellow firm mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Mastic/Binder, Calcareous particles, Fine particles	Synthetic fibers 5%	
		Mineral grains	Cellulose 4%	

**Lab ID: 20105970**      **Client Sample #: 11420-F2-234**

Location: ARC SeaTac City Hall

Layer 1 of 3	Description: Gray vinyl tile with white surface	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Vinyl/Binder, Calcareous particles	None Detected ND	

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 2 of 3	Description: Colorless soft sticky mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Mastic/Binder, Fine particles	Cellulose 3%	
Layer 3 of 3	Description: Yellow firm mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Mastic/Binder, Calcareous particles, Fine particles	Cellulose 6%	
		Wood flakes, Fine grains	Synthetic fibers 2%	

**Lab ID: 20105971**      **Client Sample #: 11420-F2-235**

Location: ARC SeaTac City Hall

Layer 1 of 2	Description: Brown flat hard compressed fibrous material with blue/brown surface	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Laminate/binder, Fine particles	Cellulose 83%	
Layer 2 of 2	Description: Off-white firm mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Mastic/Binder, Fine particles, Calcareous particles	Cellulose 6%	

**Lab ID: 20105972**      **Client Sample #: 11420-F2-236**

Location: ARC SeaTac City Hall

Layer 1 of 2	Description: Brown flat hard compressed fibrous material with blue/brown surface	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Laminate/binder, Fine particles	Cellulose 85%	
Layer 2 of 2	Description: Off-white firm mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Mastic/Binder, Fine particles, Calcareous particles	Cellulose 3%	

**Lab ID: 20105973**      **Client Sample #: 11420-F2-237**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 40  
Samples Analyzed: 40  
Method: EPA/600/R-93/116

---

<b>Layer 1 of 1</b>	<b>Description:</b> Black foamy material with colorless soft sticky mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Synthetic foam, Mastic/Binder	Cellulose 2%		<b>None Detected ND</b>

---

**Lab ID: 20105974**      **Client Sample #: 11420-F2-238**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Black foamy material with colorless soft sticky mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Synthetic foam, Mastic/Binder	Cellulose 2%		<b>None Detected ND</b>

---

**Lab ID: 20105975**      **Client Sample #: 11420-F2-239**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Green/brown fibrous material with gray foamy backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Synthetic foam, Fine particles, Mastic/Binder	Synthetic fibers 58%		<b>None Detected ND</b>
		Glass fibers 7%		

<b>Layer 2 of 2</b>	<b>Description:</b> Yellow firm mastic			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Mastic/Binder, Fine grains, Fine particles	Cellulose 5%		<b>None Detected ND</b>
	Calcareous particles			

---

**Lab ID: 20105976**      **Client Sample #: 11420-F2-240**

Location: ARC SeaTac City Hall

<b>Layer 1 of 2</b>	<b>Description:</b> Green/brown fibrous material with gray foamy backing			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Synthetic foam, Fine particles, Mastic/Binder	Synthetic fibers 60%		<b>None Detected ND</b>
		Glass fibers 8%		

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016420.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 40

Samples Analyzed: 40

Method: EPA/600/R-93/116

Layer 2 of 2	Description: Yellow firm mastic				Asbestos Type: % None Detected ND
	Non-Fibrous Materials:		Other Fibrous Materials:%		
	Mastic/Binder, Fine grains, Fine particles		Cellulose	4%	
	Calcareous particles				

**Sampled by:** Client

**Analyzed by:** William Minor

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/08/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016420.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	20105937	11420-F3-201		A
2	20105938	11420-F3-202		A
3	20105939	11420-F3-203		A
4	20105940	11420-F3-204		A
5	20105941	11420-F3-205		A
6	20105942	11420-F3-206		A
7	20105943	11420-F3-207		A
8	20105944	11420-F3-208		A
9	20105945	11420-F3-209		A
10	20105946	11420-F3-210		A
11	20105947	11420-F3-211		A
12	20105948	11420-F2-212		A
13	20105949	11420-F2-213		A
14	20105950	11420-F2-214		A
15	20105951	11420-F2-215		A
16	20105952	11420-F2-216		A
17	20105953	11420-F2-217		A
18	20105954	11420-F2-218		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	William Minor		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 11:45 AM  
 Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016420.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
19	20105955	11420-F2-219		A
20	20105956	11420-F2-220		A
21	20105957	11420-F2-221		A
22	20105958	11420-F2-222		A
23	20105959	11420-F2-223		A
24	20105960	11420-F2-224		A
25	20105961	11420-F2-225		A
26	20105962	11420-F2-226		A
27	20105963	11420-F2-227		A
28	20105964	11420-F2-228		A
29	20105965	11420-F2-229		A
30	20105966	11420-F2-230		A
31	20105967	11420-F2-231		A
32	20105968	11420-F2-232		A
33	20105969	11420-F2-233		A
34	20105970	11420-F2-234		A
35	20105971	11420-F2-235		A
36	20105972	11420-F2-236		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	William Minor		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 11:45 AM  
 Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016420.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 40

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
37	20105973	11420-F2-237		A
38	20105974	11420-F2-238		A
39	20105975	11420-F2-239		A
40	20105976	11420-F2-240		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	William Minor		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 11:45 AM  
 Entered By: Kelly AuVu

2016420

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG**

Client EHS International, Inc.  
 Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
 Project Manager David B  
 Project Location ARC SeaTac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny T @ehsintl.comJoel W @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips In %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify)		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-F3-201		
2				
3				
4				
5				
6				
7				
8				
9				
10				
11		11420-F3-211		
12		11420-F2-212		
13				
14				
15		11420-F2-215		

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny T	Sa	EHSI	9/30	8:01
Relinquished by	Sunny T	80	EHSI	9/30	4:00
Received by	Higley	MC	MC	10/1/03	8:00 AM
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.Please e-mail results. Please include David, Sunny, Joel w/ results.

2016420

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG**

Client EHS International, Inc.  
 Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
 Project Manager David B  
 Project Location ARC SeaTac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny J. @ehsintl.comJoel w @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other _____
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Paint Chips in cm	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Other	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil		<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %		<input type="checkbox"/> Chromium (Cr)	
			<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-F2-216		
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15		11420-F2-230		

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny J	So	EHSI	9/30	9:01
Relinquished by	Sunny J	So	EHSI	9/30	4:00
Received by	Thyng			10/1/20	0800
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results. Please include David, Sunny, Joel w/ results.



2016420

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.647.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG**

Client EHS International, Inc.  
 Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
 Project Manager David B.  
 Project Location ARC SeaTac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny T. @ehsintl.comJoel W. @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g. Sample area, Sample Volume, etc)	A/R
1		11420-02-231		
2				
3				
4				
5				
6				
7				
8				
9				
10		11420-02-240		
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny T	So	EHSI	9/30	9:01
Relinquished by	Sunny T	So	EHSI	9/30	4:00
Received by	Hilary	ac	mw	10/1/00	08:00B
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results. Please include David, Sunny, Joel w/ results.

October 7, 2020



David Braungardt  
EHS International  
1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**RE: Bulk Asbestos Fiber Analysis; NVL Batch # 2016422.00**

Client Project: 11420-01  
Location: ARC SeaTac City Hall

Dear Mr. Braungardt,

Enclosed please find test results for the 36 sample(s) submitted to our laboratory for analysis on 10/1/2020.

Examination of these samples was conducted for the presence of identifiable asbestos fibers using polarized light microscopy (PLM) with dispersion staining in accordance with **U. S. EPA 40 CFR Appendix E to Subpart E of Part 763**, Interim Method for the Determination of Asbestos in Bulk Insulation Samples and **EPA 600/R-93/116**, Method for the Determination of Asbestos in Bulk Building Materials.

For samples containing more than one separable layer of materials, the report will include findings for each layer (labeled Layer 1 and Layer 2, etc. for each individual layer). The asbestos concentration in the sample is determined by calibrated visual estimation.

For those samples with asbestos concentrations between 1 and 10 percent based on visual estimation, the EPA recommends a procedure known as point counting (NESHAPS, 40 CFR Part 61). Point counting is a statistically more accurate means of quantification for samples with low concentrations of asbestos.

The detection limit for the calibrated visual estimation is <1%, 400 point counts is 0.25% and 1000 point counts is 0.1%

Samples are archived for two weeks following analysis. Samples that are not retrieved by the client are discarded after two weeks.

Thank you for using our laboratory services. Please do not hesitate to call if there is anything further we can assist you with.

Sincerely,

A handwritten signature in black ink, appearing to read 'Matt Macfarlane'.

Matt Macfarlane, Asbestos Lab Supervisor



The logo for NVLAP (National Voluntary Laboratory Accreditation Program). It features the letters 'NVLAP' in a large, stylized, black, outlined font.

Lab Code: 102063-0

Enc.: Sample Results

**Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)**  
**4708 Aurora Avenue North | Seattle, WA 98103-6516**



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016422.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 36

Samples Analyzed: 36

Method: EPA/600/R-93/116

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

---

**Lab ID: 20105997      Client Sample #: 11420-R-241**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** White soft material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Binder/Filler, Fine particles, Rust	Cellulose <1%	
Debris		

---

**Lab ID: 20105998      Client Sample #: 11420-R-242**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** White soft material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Binder/Filler, Fine particles, Rust	None Detected ND	
Debris		

---

**Lab ID: 20105999      Client Sample #: 11420-R-243**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 2      Description:** Gray crumbly soft material

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Binder/Filler, Fine particles	None Detected ND	

**Layer 2 of 2      Description:** Black soft material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%	<b>Asbestos Type: %</b> <b>None Detected ND</b>
Binder/Filler, Fine particles, Debris	Synthetic fibers 2%	
	Cellulose <1%	

---

**Lab ID: 20106000      Client Sample #: 11420-R-244**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016422.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 36  
Samples Analyzed: 36  
Method: EPA/600/R-93/116

Layer 1 of 2	Description: Gray crumbly soft material	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Fine particles	Cellulose <1%	
Layer 2 of 2	Description: Black soft material with debris	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Fine particles, Debris	Cellulose <1%	

**Lab ID: 20106001 Client Sample #: 11420-R-245**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

Layer 1 of 2	Description: Gray soft rubbery material with debris	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Fine particles, Debris	None Detected ND	
Layer 2 of 2	Description: Thin pale gray crumbly material with debris	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Fine grains, Fine particles	None Detected ND	

**Lab ID: 20106002 Client Sample #: 11420-R-246**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

Layer 1 of 2	Description: Gray soft material with debris	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Binder/Filler, Fine particles, Debris	Cellulose <1%	
Layer 2 of 2	Description: Black loose asphaltic mastic	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % None Detected ND
		Asphalt/Binder, Fine particles	None Detected ND	

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016422.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 36

Samples Analyzed: 36

Method: EPA/600/R-93/116

---

**Lab ID: 20106003      Client Sample #: 11420-R-247**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 1 for further analysis. Unsure of correct layer sequence.

**Layer 1 of 2      Description:** Trace gray soft material with debris

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles, Debris

None Detected    ND

**None Detected ND**

**Layer 2 of 2      Description:** Black loose asphaltic mastic

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Asphalt/Binder, Fine particles

None Detected    ND

**None Detected ND**

---

**Lab ID: 20106004      Client Sample #: 11420-R-248**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Pale gray rubbery material with debris

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles, Debris

None Detected    ND

**None Detected ND**

---

**Lab ID: 20106005      Client Sample #: 11420-R-249**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Black soft crumbly asphaltic material

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Asphalt/Binder, Fine particles, Fine grains

Cellulose    9%

**None Detected ND**

---

**Lab ID: 20106006      Client Sample #: 11420-R-250**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Off-white soft material with paint and debris

Non-Fibrous Materials:

Other Fibrous Materials: %

**Asbestos Type: %**

Binder/Filler, Fine particles, Paint

Polyethylene fibers    7%

**None Detected ND**

Debris

Cellulose    <1%

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Date:** 10/07/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016422.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 36

Samples Analyzed: 36

Method: EPA/600/R-93/116

**Lab ID: 20106007 Client Sample #: 11420-R-251**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Thin clear soft adhesive with foil and debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Adhesive/Binder, Fine particles, Metal foil	None Detected ND
Debris	

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20106008 Client Sample #: 11420-R-252**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Thin clear soft adhesive with foil and debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Adhesive/Binder, Fine particles, Metal foil	Glass fibers 3%
Debris	Cellulose <1%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20106009 Client Sample #: 11420-R-253**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** White fibrous material with white soft coating and debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Debris	Synthetic fibers 59%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20106010 Client Sample #: 11420-R-254**

Location: ARC SeaTac City Hall

Comments: Insufficient material in layer 2 for further analysis.

**Layer 1 of 2 Description:** White fibrous material with white soft coating and debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Debris	Synthetic fibers 55%

**Asbestos Type: %**  
**None Detected ND**

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government





# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016422.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 36  
Samples Analyzed: 36  
Method: EPA/600/R-93/116

---

<b>Layer 2 of 2</b>	<b>Description:</b> Trace black asphaltic material with paint and debris		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Asphalt/Binder, Fine particles, Paint	None Detected ND	<b>Chrysotile 2%</b>
	Debris		

---

**Lab ID: 20106011**      **Client Sample #: 11420-R-255**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 2</b>	<b>Description:</b> White woven fibrous material with black soft coating and debris		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Binder/Filler, Fine grains, Fine particles	Cellulose 67%	<b>None Detected ND</b>
	Debris		

---

<b>Layer 2 of 2</b>	<b>Description:</b> Black asphaltic material with paint		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Asphalt/Binder, Fine grains, Paint	None Detected ND	<b>Chrysotile 8%</b>

---

**Lab ID: 20106012**      **Client Sample #: 11420-R-256**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> White woven fibrous material with white rubbery coating and debris		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Debris	Glass fibers 71%	<b>None Detected ND</b>

---

**Lab ID: 20106013**      **Client Sample #: 11420-R-257**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> White woven fibrous material with white rubbery coating and debris		
	Non-Fibrous Materials:	Other Fibrous Materials: %	<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Debris	Glass fibers 72%	<b>None Detected ND</b>

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016422.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 36  
Samples Analyzed: 36  
Method: EPA/600/R-93/116

---

**Lab ID: 20106014      Client Sample #: 11420-R-258**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Pale gray soft material with debris

Non-Fibrous Materials:	Other Fibrous Materials: %
Binder/Filler, Fine particles, Debris	Polyethylene fibers    6%
	Cellulose                <1%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20106015      Client Sample #: 11420-R-259**

Location: ARC SeaTac City Hall

**Layer 1 of 1      Description:** Beige soft material with debris

Non-Fibrous Materials:	Other Fibrous Materials: %
Binder/Filler, Fine particles, Debris	Polyethylene fibers    3%

**Asbestos Type: %**  
**None Detected ND**

---

**Lab ID: 20106016      Client Sample #: 11420-R-260**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

**Layer 1 of 2      Description:** White soft material with white fibrous material and debris

Non-Fibrous Materials:	Other Fibrous Materials: %
Binder/Filler, Fine particles, Debris	Synthetic fibers    38%

**Asbestos Type: %**  
**None Detected ND**

**Layer 2 of 2      Description:** Black asphaltic material with paint and debris

Non-Fibrous Materials:	Other Fibrous Materials: %
Asphalt/Binder, Fine particles, Paint	Cellulose                <1%
Debris	

**Asbestos Type: %**  
**Chrysotile 6%**

---

**Lab ID: 20106017      Client Sample #: 11420-R-261**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

**Batch #: 2016422.00**  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 36  
Samples Analyzed: 36  
Method: EPA/600/R-93/116

---

<b>Layer 1 of 1</b>	<b>Description:</b> Gray soft rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	None Detected	ND	<b>None Detected ND</b>

---

**Lab ID: 20106018**      **Client Sample #: 11420-R-262**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Pale gray soft rubbery material with paint and debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Paint	Polyethylene fibers	6%	<b>None Detected ND</b>
	Debris			

---

**Lab ID: 20106019**      **Client Sample #: 11420-R-263**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Gray soft material with debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Debris	Cellulose	<1%	<b>None Detected ND</b>

---

**Lab ID: 20106020**      **Client Sample #: 11420-R-264**

Location: ARC SeaTac City Hall

<b>Layer 1 of 1</b>	<b>Description:</b> Gray soft material with debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Debris	None Detected	ND	<b>None Detected ND</b>

---

**Lab ID: 20106021**      **Client Sample #: 11420-R-265**

Location: ARC SeaTac City Hall

Comments: Unsure of correct layer sequence.

<b>Layer 1 of 3</b>	<b>Description:</b> White soft material with white fibrous mesh and debris			
	Non-Fibrous Materials:	Other Fibrous Materials: %		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Debris	Synthetic fibers	36%	<b>None Detected ND</b>

---

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Date:** 10/07/2020

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016422.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 36

Samples Analyzed: 36

Method: EPA/600/R-93/116

Layer 2 of 3	Description: Thin black asphaltic material with paint	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % <b>Chrysotile 5%</b>
		Asphalt/Binder, Fine particles, Paint	None Detected ND	
Layer 3 of 3	Description: Black brittle material with white fibrous mesh with soft white coating with rust and debris	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % <b>None Detected ND</b>
		Binder/Filler, Fine grains, Fine particles	Cellulose 44%	
		Rust, Debris		

**Lab ID: 20106022 Client Sample #: 11420-E-266**

Location: ARC SeaTac City Hall

Layer 1 of 1	Description: Black rubbery material with debris	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % <b>None Detected ND</b>
		Binder/Filler, Fine particles, Debris	None Detected ND	

**Lab ID: 20106023 Client Sample #: 11420-E-267**

Location: ARC SeaTac City Hall

Layer 1 of 1	Description: Thin black rubbery material with debris	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % <b>None Detected ND</b>
		Binder/Filler, Fine particles, Debris	Cellulose <1%	

**Lab ID: 20106024 Client Sample #: 11420-E-268**

Location: ARC SeaTac City Hall

Layer 1 of 1	Description: Thin black rubbery material with debris	Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: % <b>None Detected ND</b>
		Binder/Filler, Fine particles, Debris	Cellulose <1%	
			Glass fibers <1%	

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016422.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 36

Samples Analyzed: 36

Method: EPA/600/R-93/116

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Lab ID: 20106025 Client Sample #: 11420-E-269**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Black rubbery material with paint and debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Paint	Cellulose <1%
Debris	

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20106026 Client Sample #: 11420-E-270**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Gray rubbery material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Debris	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20106027 Client Sample #: 11420-E-271**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Gray rubbery material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Debris	Cellulose <1%

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20106028 Client Sample #: 11420-E-272**

Location: ARC SeaTac City Hall

**Layer 1 of 1 Description:** Black rubbery material with debris

Non-Fibrous Materials:	Other Fibrous Materials:%
Binder/Filler, Fine particles, Debris	None Detected ND

**Asbestos Type: %**  
**None Detected ND**

**Lab ID: 20106029 Client Sample #: 11420-F2-273**

Location: ARC SeaTac City Hall

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EHS International

Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Attention: Mr. David Braungardt**

Project Location: ARC SeaTac City Hall

**Batch #: 2016422.00**

Client Project #: 11420-01

Date Received: 10/1/2020

Samples Received: 36

Samples Analyzed: 36

Method: EPA/600/R-93/116

---

<b>Layer 1 of 1</b>	<b>Description:</b> Off-white soft material with paint			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Paint	Cellulose <1%		<b>None Detected ND</b>

---

**Lab ID: 20106030**      **Client Sample #: 11420-E-274**

Location: ARC SeaTac City Hall

---

<b>Layer 1 of 1</b>	<b>Description:</b> Black rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	None Detected ND		<b>None Detected ND</b>

---

**Lab ID: 20106031**      **Client Sample #: 11420-E-275**

Location: ARC SeaTac City Hall

---

<b>Layer 1 of 1</b>	<b>Description:</b> Black rubbery material			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles	Cellulose <1%		<b>None Detected ND</b>

---

**Lab ID: 20106032**      **Client Sample #: 11420-F1-276**

Location: ARC SeaTac City Hall

---

<b>Layer 1 of 1</b>	<b>Description:</b> Off-white soft material with paint and debris			
	Non-Fibrous Materials:	Other Fibrous Materials:%		<b>Asbestos Type: %</b>
	Binder/Filler, Fine particles, Paint	Cellulose <1%		<b>None Detected ND</b>
	Debris			

---

**Sampled by:** Client

**Analyzed by:** Hilary Crumley

**Reviewed by:** Matt Macfarlane

**Date:** 10/07/2020

**Date:** 10/07/2020

  
Matt Macfarlane, Asbestos Lab Supervisor

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using both EPA 600/R-93/116 and 600/M4-82-020 Methods with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government



# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016422.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 36

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	20105997	11420-R-241		A
2	20105998	11420-R-242		A
3	20105999	11420-R-243		A
4	20106000	11420-R-244		A
5	20106001	11420-R-245		A
6	20106002	11420-R-246		A
7	20106003	11420-R-247		A
8	20106004	11420-R-248		A
9	20106005	11420-R-249		A
10	20106006	11420-R-250		A
11	20106007	11420-R-251		A
12	20106008	11420-R-252		A
13	20106009	11420-R-253		A
14	20106010	11420-R-254		A
15	20106011	11420-R-255		A
16	20106012	11420-R-256		A
17	20106013	11420-R-257		A
18	20106014	11420-R-258		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	Hilary Crumley		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 11:53 AM  
 Entered By: Kelly AuVu

# ASBESTOS LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016422.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 1:05 PM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** PLM Bulk

**Item Code** ASB-02 EPA 600/R-93-116 Asbestos by PLM <bulk>

**Total Number of Samples** 36

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
19	20106015	11420-R-259		A
20	20106016	11420-R-260		A
21	20106017	11420-R-261		A
22	20106018	11420-R-262		A
23	20106019	11420-R-263		A
24	20106020	11420-R-264		A
25	20106021	11420-R-265		A
26	20106022	11420-E-266		A
27	20106023	11420-E-267		A
28	20106024	11420-E-268		A
29	20106025	11420-E-269		A
30	20106026	11420-E-270		A
31	20106027	11420-E-271		A
32	20106028	11420-E-272		A
33	20106029	11420-F2-273		A
34	20106030	11420-E-274		A
35	20106031	11420-E-275		A
36	20106032	11420-F1-276		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Hilary Crumley		NVL	10/1/20	800
<b>Analyzed by</b>	Hilary Crumley		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> <b>Faxed</b> <input type="checkbox"/> <b>Emailed</b>					

**Special Instructions:** Received updated COCs 10/1 at 1305 -KA

Date: 10/1/2020  
 Time: 11:53 AM  
 Entered By: Kelly AuVu

**NVL Laboratories, Inc.**  
 4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

# CHAIN of CUSTODY SAMPLE LOG

# 2016422

L A B S  
HAZARDOUS MATERIALS ANALYSIS

Client EHS International, Inc.  
 Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
 Project Manager David B  
 Project Location ARC SeaTac City Hall

NVL Batch Number \_\_\_\_\_  
 Client Job Number 11420-01  
 Total Samples \_\_\_\_\_  
 Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days  
 Please call for TAT less than 24 Hrs  
 Email address Sunny T @ehsintl.com  
Joel W @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-01-241		
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15		11420-01-255		

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny T	SA	EHSI	9/30	9:01
Relinquished by	Sunny T	88	EHSI	9/30	4:00
Received by	Hlegary	<i>[Signature]</i>	<i>[Signature]</i>	10/1/00	0800B
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results. Please include David, Sunny, Joel w/ results.

2016422

**NVL Laboratories, Inc.**  
 4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

# CHAIN of CUSTODY SAMPLE LOG



Client EHS International, Inc.  
 Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
 Project Manager David B  
 Project Location ARC SeaTac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01

Total Samples \_\_\_\_\_

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny T @ehsintl.com

Joel w @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other _____
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All B	<b>Other Metals</b>
<input type="checkbox"/> Total Metals	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Paint Chips in cm	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/Wipe (Area)	<input type="checkbox"/> Other	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil		<input type="checkbox"/> Chromium (Cr)	<input type="checkbox"/> Zinc (Zn)
		<input type="checkbox"/> Paint Chips in %		<input type="checkbox"/> Lead (Pb)	
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-R-256		
2				
3				
4				
5				
6				
7				
8				
9				
10		11420-R-265		
11		11420-F-266		
12				
13				
14				
15		11420-F-270		

	Print Below	Sign Below	Company	Date	Time
Sampled by	Sunny J	So	EHSI	9/30	9:01
Relinquished by	Sunny J	So	EHSI	9/30	4:00
Received by	Hilary	[Signature]	[Signature]	10/1/2004	04:00 DB
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results. Please include David, Sunny, Joel w/ results.

2016422

## NVL Laboratories, Inc.

4708 Aurora Ave N., Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

CHAIN of CUSTODY  
SAMPLE LOG

Client EHS International, Inc.  
 Street 1011 SW Klickitat Way  
Suite 104  
Seattle, WA 98134  
 Project Manager David B  
 Project Location ARC Seatac City Hall

NVL Batch Number \_\_\_\_\_  
 Client Job Number 11420-01

## Total Samples \_\_\_\_\_

Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny J @ehsintl.comJoel W @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other _____																																								
<input checked="" type="checkbox"/> Asbestos Bulk	<input checked="" type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk																																									
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration																																										
<table border="1"> <tr> <th>METALS</th> <th>Inst./Det Limit Matrix</th> <th>RCRA Metals</th> <th>Other Metals</th> </tr> <tr> <td><input type="checkbox"/> Total Metals</td> <td><input type="checkbox"/> Air Filter</td> <td><input type="checkbox"/> Paint Chips in cm</td> <td><input type="checkbox"/> All 8</td> </tr> <tr> <td><input type="checkbox"/> TCLP</td> <td><input type="checkbox"/> FAA (ppm)</td> <td><input type="checkbox"/> Drinking water</td> <td><input type="checkbox"/> Mercury (Hg)</td> </tr> <tr> <td></td> <td><input type="checkbox"/> ICP (ppm)</td> <td><input type="checkbox"/> Waste Water</td> <td><input type="checkbox"/> Barium (Ba)</td> </tr> <tr> <td></td> <td><input type="checkbox"/> GFAA (ppb)</td> <td><input type="checkbox"/> Dust/wipe (Area)</td> <td><input type="checkbox"/> Selenium (Se)</td> </tr> <tr> <td></td> <td><input type="checkbox"/> Soil</td> <td><input type="checkbox"/> Other</td> <td><input type="checkbox"/> Silver (Ag)</td> </tr> <tr> <td></td> <td><input type="checkbox"/> Paint Chips in %</td> <td><input type="checkbox"/> Arsenic (As)</td> <td><input type="checkbox"/> All 3</td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Cadmium (Cd)</td> <td><input type="checkbox"/> Copper (Cu)</td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Chromium (Cr)</td> <td><input type="checkbox"/> Nickel (Ni)</td> </tr> <tr> <td></td> <td></td> <td><input type="checkbox"/> Lead (Pb)</td> <td><input type="checkbox"/> Zinc (Zn)</td> </tr> </table>						METALS	Inst./Det Limit Matrix	RCRA Metals	Other Metals	<input type="checkbox"/> Total Metals	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Paint Chips in cm	<input type="checkbox"/> All 8	<input type="checkbox"/> TCLP	<input type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Mercury (Hg)		<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Barium (Ba)		<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Selenium (Se)		<input type="checkbox"/> Soil	<input type="checkbox"/> Other	<input type="checkbox"/> Silver (Ag)		<input type="checkbox"/> Paint Chips in %	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> All 3			<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Copper (Cu)			<input type="checkbox"/> Chromium (Cr)	<input type="checkbox"/> Nickel (Ni)			<input type="checkbox"/> Lead (Pb)	<input type="checkbox"/> Zinc (Zn)
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		<input type="checkbox"/> Chromium (Cr)	<input type="checkbox"/> Nickel (Ni)																																										
		<input type="checkbox"/> Lead (Pb)	<input type="checkbox"/> Zinc (Zn)																																										
<input type="checkbox"/> Other Types of Analysis <input type="checkbox"/> Fiberglass <input type="checkbox"/> Nuisance Dust <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Silica <input type="checkbox"/> Respirable Dust																																													

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		11420-E-271		
2		11420-E-272		
3		11420-F1-273		
4		11420-E-274		
5		11420-E-275		
6		11420-F1-276		
7				
8				
9				
10				
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	<u>Sunny J</u>	<u>So</u>	<u>EHSI</u>	<u>9/30</u>	<u>8:35</u>
Relinquished by	<u>Sunny J</u>	<u>So</u>	<u>EHSI</u>	<u>9/30</u>	<u>4:00</u>
Received by	<u>Hlgay</u>	<u>MC</u>	<u>MC</u>	<u>10/1/20</u>	<u>0800</u>
Analyzed by					
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results.

Please include David, Sunny, Joel w/ results.



## SEATTLE ASBESTOS TEST, LLC

Seattle Laboratory: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel: 206.633.1111, Fax: 206.633.4747, NVLAP Lab Code: 201057-0

[www.seattleasbestostest.com](http://www.seattleasbestostest.com), [admin@seattleasbestostest.com](mailto:admin@seattleasbestostest.com)

Project Manager: Sunny Joshi, Joel Whelchel  
Client: EHS International, Inc.  
Address: 1011 SW Klickitat Way, Suite 104, Seattle, WA  
98134  
Tel: 425.455.2959

Date Analyzed: 10/6/2020  
Client Job#: 11420-01  
Project Location: ARC Seatac City Hall  
Laboratory batch#: 202021445  
Samples Received: 6

Enclosed please find the test results for the bulk samples submitted to our laboratory for asbestos analysis. Analysis was performed using polarized light microscopy (PLM) in accordance with Test Method US EPA - 40 CFR Appendix E of Part 763, Interim Method of Determination of Asbestos in Bulk Insulation Samples and Test Method US EPA/600/R-93/116.

Percentages for this report are done by visual estimate and relate to the suggested acceptable error ranges by the method. Since variation in data increases as the quantity of asbestos decreases toward the limit of detection, the EPA recommends point counting for samples containing between <1% and 10% asbestos (NESHAP, 40 CFR Part 61). Statistically, point counting is a more accurate method. If you feel a point count might be beneficial, please feel free to call and request one.

The test results refer only to the samples or items submitted and tested. The accuracy with which these samples represent the actual materials is totally dependent on the acuity of the person who took the samples. This report must not be used by the client to claim product certification, approval, or endorsement by Seattle Asbestos Test, LLC, NVLAP, NIST, or any agency of the Federal government. The test report or calibration certificate shall not be reproduced except in full, without written approval of the laboratory.

This report is highly confidential and will not be released without your consent. Samples are archived for 30 days after the analysis, and disposed of as hazardous waste thereafter.

Thank you for using our service and let us know if we can further assist you.

Sincerely



Steve (Fanyao) Zhang  
President



202021445

# SEATTLE ASBESTOS TEST, LLC

LYNNWOOD LAB: 19701 Scriber Lake Road, Suite 103, Lynnwood, WA 98036, Tel:425.673.9850, Fax:425.673.9810, NVLAP Accreditation Lab Code: 200768,  
 BELLEVUE LAB: 12727 Northup Way, Suite 1, Bellevue, WA 98005, Tel:425.861.1111, Fax:425.861.1118, NVLAP Accreditation Lab Code: 200876,  
 SEATTLE LAB: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel:206.633.1111, Fax:206.633.4747, NVLAP Accreditation Lab Code: 201057, Email: admin@seattleasbestostest.com, Website: www.seattleasbestostest.com

## CHAIN OF CUSTODY

☐ Bulk Asbestos ☐ Point Count 400 ☐ Point Count 1000 ☐ Point Count Gravimetric ☐ Other (Specify)  
☐ 1 Hour ☐ 2 Hours ☐ Same day (4 to 6 Hrs.) ☐ 1 Day ☒ 5 Days

EHS International, Inc.

1011 SW Klickitat Way, Suite 104, Seattle, WA 98134

Tel: 206.381.1128

Fax: 206.254.4279

Job#: 11420-01

Proj. Location: ARC Seatac City Hall

# of Samples: 6

Project Manager / Tech.	Cell	Email	Proj. Manager / Tech.	Cell	Email
<input type="checkbox"/> Brett Racine	206.940.2236	brettr@ehsintl.com	<input checked="" type="checkbox"/> Sunny Joshi	858.357.3428	Sunny.J@ehsintl.com
<input type="checkbox"/> Rory Peterson	425.766.8342	roryp@ehsintl.com	<input type="checkbox"/> Shonnessy Gilmore	425.471.2166	Shonnessyg@ehsintl.com
<input checked="" type="checkbox"/> Joel Wheelchel	206.707.5642	Joelw@ehsintl.com	<input type="checkbox"/> Soumeya Benzina	206.307.2515	SoumeyaB@ehsintl.com
<input type="checkbox"/> Herb Brod	425.766.1546	herbb@ehsintl.com	<input type="checkbox"/> Ethan Tracy	360.621.7867	EthanT@ehsintl.com
<input type="checkbox"/> Stephanie Bolton	206.556.8170	stephanieb@ehsintl.com	<input type="checkbox"/> Habib Quraishi	425.382.9106	HabibQ@ehsintl.com
<input type="checkbox"/> Ryan Opitz	206.321.8222	Rvano@ehsintl.com	<input type="checkbox"/> Kenna Renfrow	425.301.9098	kennar@ehsintl.com

SEQ#	CLIENT SAMPLE #	SAMPLE DESCRIPTION	LOCATION	NOTES
1	11420-R-243QA			
2	11420-R-248QA			
3	11420-R-251QA			
4	11420-F2-224QA			
5	11420-F2-222QA			
6	11420-F2-220QA			
7				
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17				
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19				
20				

	Print Name	Signature	Company	Date	Time
Sampled:	Sunny J	[Signature]	EHS International, Inc.	9/30/20	10:10
Relinquished:	Sunny J	[Signature]	EHS International, Inc.	9/30/20	11:10
Delivered:	Sunny T.	[Signature]	EHS International, Inc.	9/30/20	4:00
Received:	[Signature]	[Signature]	Seattle Asbestos Test	9/30/20	4:05
Analyzed:	[Signature]	[Signature]	Seattle Asbestos Test	10/6/20	10:00
Reported:			Seattle Asbestos Test		

Seattle Asbestos Test warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted and disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. Seattle Asbestos Test accepts no legal responsibility for the purpose for which the client uses the test results. By signing on this form, the clients agree to relieve Seattle Asbestos Test of any liability that may arise from the test results. It is the client's responsibility to make sure the samples are appropriately taken according to federal and local regulations. Invoices paid late may be charged of interest, and invoices go to collection may be charged 17% to 25% of collection fee. NSF checks will be charged of \$50.

SAMPLE DELIVERED TO:

☐ Lynnwood Lab

☐ Bellevue Lab

☒ Seattle Lab

Page 1 of ( )

RESULTS REPORTING METHOD:

☐ Phone

☐ Fax

☒ E-mail

OTHER:

☐ Composite all Wallboard Samples

☐ Point Count ..... % or loss asbestos

## SEATTLE ASBESTOS TEST

Seattle Laboratory: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel: 206.633.1111, Fax: 206.633.4747, NVLAP Lab Code: 201057-0

Disclaimer: This report must not be used by the client to claim product certification, approval, or endorsement by Seattle Asbestos Test, LLC, NVLAP, NIST, or any agency of the Federal government.

### ANALYTICAL LABORATORY REPORT

PLM by Method EPA/600/R-93/116

Attn.: Sunny Joshi, Joel  
Whelchel

Client: EHS International, Inc.

Address: 1011 SW Klickitat Way, Suite 104, Seattle, WA  
98134

Job#: 11420-01

Batch#: 202021445

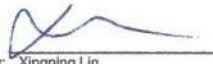
Date Received: 9/30/2020


Samples Rec'd: 6

Date Analyzed: 10/6/2020

Samples Analyzed: 6

Project Loc.: ARC Seatac City Hall

Analyzed by:  Xingping Lin

Reviewed by:  Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
1	11420-R -243 QA	1	Black soft material		None detected	Filler, Binder	3	Cellulose
2	11420-R -248 QA	1	Gray soft/elastic material		None detected	Binder, Filler	4	Cellulose
		2	Trace tan brittle material		None detected	Filler, Binder	2	Cellulose
3	11420-R -251 QA	1	Silver foil		None detected	Foil/binder		None detected
		2	Clear/yellow mastic		None detected	Mastic/binder	3	Cellulose
4	11420-F2 -224 QA	1	Black rubbery material		None detected	Rubber/binder	2	Cellulose
		2	Cream mastic		None detected	Mastic/binder	2	Cellulose
5	11420-F2 -222 QA	1	Gray woven fibrous material		None detected	Filler, Binder	85	Synthetic fibers
		2	Gray fibrous material		None detected	Filler	82	Glass fibers
		3	Tan mastic		None detected	Mastic/binder	3	Cellulose
6	11420-F2 -220 QA	1	Beige tile		None detected	Vinyl/binder, Mineral grains	2	Cellulose
		2	Tan mastic		None detected	Mastic/binder	4	Cellulose
		3	Trace gray fibrous material		None detected	Binder/filler	65	Cellulose

## SEATTLE ASBESTOS TEST, LLC

Seattle Laboratory: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel: 206.633.1111, Fax: 206.633.4747, NVLAP Lab Code: 201057-0

www.seattleasbestostest.com, admin@seattleasbestostest.com

Project Manager: Sunny Joshi, Joel Whelchel

Client: EHS International, Inc.

Address: 1011 SW Klickitat Way, Suite 104, Seattle, WA  
98134

Tel: 425.455.2959

Date Analyzed: 10/6/2020

Client Job#: 11420-01

Project Location: ARC City of Seatac City Hall

Laboratory batch#: 202021434

Samples Received: 6

Enclosed please find the test results for the bulk samples submitted to our laboratory for asbestos analysis. Analysis was performed using polarized light microscopy (PLM) in accordance with Test Method US EPA - 40 CFR Appendix E of Part 763, Interim Method of Determination of Asbestos in Bulk Insulation Samples and Test Method US EPA/600/R-93/116.

Percentages for this report are done by visual estimate and relate to the suggested acceptable error ranges by the method. Since variation in data increases as the quantity of asbestos decreases toward the limit of detection, the EPA recommends point counting for samples containing between <1% and 10% asbestos (NESHAP, 40 CFR Part 61). Statistically, point counting is a more accurate method. If you feel a point count might be beneficial, please feel free to call and request one.

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This report is highly confidential and will not be released without your consent. Samples are archived for 30 days after the analysis, and disposed of as hazardous waste thereafter.

Thank you for using our service and let us know if we can further assist you.

Sincerely



Steve (Fanyao) Zhang  
President



202021434-M

## SEATTLE ASBESTOS TEST, LLC

LYNNWOOD LAB: 19701 Scriber Lake Road, Suite 103, Lynnwood, WA 98036, Tel:425.673.9850, Fax:425.673.9810, NVLAP Accreditation Lab Code: 200768,  
 BELLEVUE LAB: 12727 Northup Way, Suite 1, Bellevue, WA 98005, Tel:425.861.1111, Fax:425.861.1118, NVLAP Accreditation Lab Code: 200876,  
 SEATTLE LAB: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel:206.633.1111, Fax:206.633.4747, NVLAP Accreditation Lab Code: 201057, Email: admin@seattleasbestos.com, Website: www.seattleasbestos.com

## CHAIN OF CUSTODY

☐ Bulk Asbestos ☐ Point Count 400 ☐ Point Count 1000 ☐ Point Count Gravimetric ☐ Other (Specify) \_\_\_\_\_  
☐ 1 Hour ☐ 2 Hours ☐ Same day (4 to 6 Hrs.) ☐ 1 Day ☒ 5 Days

EHS International, Inc.

1011 SW Klickitat Way, Suite 104, Seattle, WA 98134

Tel: 206.381.1128

Fax: 206.254.4279

Job#: 11420-01 Proj. Location: ABC City of Seattle City Hall # of Samples: 6

	Project Manager / Tech.	Cell	Email	Proj. Manager / Tech.	Cell	Email
<input type="checkbox"/>	Brett Racine	206.940.2236	brettr@ehsintl.com	<input checked="" type="checkbox"/>	Sunny Joshi	858.357.3428 Sunny.J@ehsintl.com
<input type="checkbox"/>	Rory Peterson	425.766.8342	rorvp@ehsintl.com	<input type="checkbox"/>	Shonnessy Gilmore	425.471.2166 Shonnessygo@ehsintl.com
<input checked="" type="checkbox"/>	Joel Wheelchel	206.707.5642	Joelw@ehsintl.com	<input type="checkbox"/>	Soumeva Benzina	206.307.2515 SoumevaB@ehsintl.com
<input type="checkbox"/>	Herb Brod	425.766.1546	herbb@ehsintl.com	<input type="checkbox"/>	Ethan Tracy	360.621.7867 EthanT@ehsintl.com
<input type="checkbox"/>	Stephanie Bolton	206.556.8170	stephanieb@ehsintl.com	<input type="checkbox"/>	Habib Quraishi	425.382.9106 HabibQ@ehsintl.com
<input type="checkbox"/>	Ryan Opitz	206.321.8222	Ryano@ehsintl.com	<input type="checkbox"/>	Kenna Renfrow	425.301.9098 kennar@ehsintl.com

SEQ#	CLIENT SAMPLE #	SAMPLE DESCRIPTION	LOCATION	NOTES
1	11420-F1-09QA	4" Gray cove base on yellow		
2		mastic		
3	11420-F1-79QA			
4	11420-F1-80QA			
5	11420-F1-103QA			
6	11420-F1-82QA			
7	11420-F1-105QA			
8				
9				
10				
11				
12				
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16				
17				
18				
19				
20				

	Print Name	Signature	Company	Date	Time
Sampled:	Sunny J	SJ	EHS International, Inc.	9/24/20	10:00
Relinquished:	Sunny J	SJ	EHS International, Inc.	9/24/20	12:00
Delivered:	Sunny J	SJ	EHS International, Inc.	9/24/20	0:00 PM
Received:	210 Pkg LCN	[Signature]	Seattle Asbestos Test	9/20/20	9:00
Analyzed:	[Signature]	[Signature]	Seattle Asbestos Test	10/6/20	9:00
Reported:			Seattle Asbestos Test		

Seattle Asbestos Test warrants the test results to be of a precision normal for the type and methodology employed for each sample submitted and disclaims any other warrants, expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. Seattle Asbestos Test accepts no legal responsibility for the purpose for which the client uses the test results. By signing on this form, the clients agree to relieve Seattle Asbestos Test of any liability that may arise from the test results. It is the client's responsibility to make sure the samples are appropriately taken according to federal and local regulations. Invoices paid late may be charged of interest, and invoices go to collection may be charged 17% to 25% of collection fee. NSF checks will be charged of \$50.

SAMPLE DELIVERED TO:

RESULTS REPORTING METHOD:

OTHER:

☐ Lynnwood Lab☐ Phone☐ Composite all Wallboard Samples☐ Bellevue Lab☐ Fax☒ Seattle Lab☒ E-mail☐ Point Count ..... % or less asbestos

Page 1 of ( )

## SEATTLE ASBESTOS TEST

Seattle Laboratory: 4500 9th Ave. NE, Suite 300, Seattle, WA 98105, Tel: 206.633.1111, Fax: 206.633.4747, NVLAP Lab Code: 201057-0

Disclaimer: This report must not be used by the client to claim product certification, approval, or endorsement by Seattle Asbestos Test, LLC, NVLAP, NIST, or any agency of the Federal government.

### ANALYTICAL LABORATORY REPORT PLM by Method EPA/600/R-93/116

Attn.: Sunny Joshi, Joel  
Whelchel

Client: EHS International, Inc.

Address: 1011 SW Klickitat Way, Suite 104, Seattle, WA  
98134

Job#: 11420-01

Batch#: 202021434

Date Received: 9/30/2020

Samples Rec'd: 6

Date Analyzed: 10/6/2020

Samples Analyzed: 6

Rev.code:E1e340

Project Loc.: ARC City of Seatac City Hall

*SZhang*

Analyzed by: Xingping Lin

Reviewed by: Steve (Fanyao) Zhang, President

Lab ID	Client Sample ID	Layer	Description	%	Asbestos Fibers	Non-fibrous Components	%	Non-asbestos Fibers
1	11420-F1-09QA	1	Gray rubbery material		None detected	Rubber/binder	2	Cellulose
		2	Yellow mastic		None detected	Mastic/binder	2	Cellulose
		3	Trace yellow fibrous material with paint		None detected	Filler, Paint	90	Cellulose
2	11420-F1-79QA	1	Black soft/elastic material with paint		None detected	Binder, Filler, Paint	4	Cellulose
		2	Trace black mastic		None detected	Mastic/binder	3	Cellulose
3	11420-F1-80QA	1	White soft/elastic material with paint		None detected	Binder, Filler, Paint	3	Cellulose
		2	Trace black/yellow mastic		None detected	Mastic/binder	2	Cellulose
4	11420-F1-103QA	1	Yellow soft/elastic material with paint		None detected	Binder, Filler, Paint	4	Cellulose
		2	Trace yellow mastic		None detected	Mastic/binder	3	Cellulose
		3	Trace tan brittle material		None detected	Filler, Binder	2	Cellulose
5	11420-F1-82QA	1	Purple rubbery material with trace sand		None detected	Rubber/binder, Sand	2	Cellulose
		2	Cream mastic		None detected	Mastic/binder	2	Cellulose
		3	Trace white powdery material with paint		None detected	Binder/filler, Paint	5	Cellulose
6	11420-F1-105QA	1	Red soft material		None detected	Filler, Binder	3	Cellulose

October 7, 2020

David Braungardt

**EHS International**

1011 SW Klickitat Way, Suite 104

Seattle, WA 98134



**NVL Batch # 2016395.00**

**RE: Total Metal Analysis**  
**Method: EPA 7000B Lead by FAA <paint>**  
**Item Code: FAA-02**

Client Project: 11420-01

Location: ARC SeaTac City Hall

Dear Mr. Braungardt,

NVL Labs received 4 sample(s) for the said project on 10/1/2020. Preparation of these samples was conducted following protocol outlined in EPA 3051/7000B, unless stated otherwise.

Analysis of these samples was performed using analytical instruments in accordance with EPA 7000B Lead by FAA <paint>. The results are usually expressed in mg/Kg and percentage (%). Test results are not blank corrected.

For recent regulation updates pertaining to current regulatory levels or permissible exposure levels, please call your local regulatory agencies for more detail.

At NVL Labs all analyses are performed under strict guidelines of the Quality Assurance Program. This report is considered highly confidential and will not be released without your approval. Samples are archived after two weeks from the analysis date. Please feel free to contact us at 206-547-0100, in case you have any questions or concerns.

Sincerely,

Nick Ly, Technical Director



Enc.: Sample results



Phone: 206 547.0100 | Fax: 206 634.1936 | Toll Free: 1.888.NVL.LABS (685.5227)  
4708 Aurora Avenue North | Seattle, WA 98103-6516



# Analysis Report

## Total Lead (Pb)



Client: EHS International  
Address: 1011 SW Klickitat Way, Suite 104  
Seattle, WA 98134

**Batch #: 2016395.00**

Matrix: Paint  
Method: EPA 3051/7000B  
Client Project #: 11420-01  
Date Received: 10/1/2020  
Samples Received: 4  
Samples Analyzed: 4

**Attention: Mr. David Braungardt**  
Project Location: ARC SeaTac City Hall

Lab ID	Client Sample #	Sample Weight (g)	RL in mg/Kg	Results in mg/Kg	Results in percent
20105657	11420-Pb01	0.0254	390	< 390	<0.039
20105658	11420-Pb02	0.0178	560	< 560	<0.056
20105659	11420-Pb03	0.1993	50	< 50	<0.0050
20105660	11420-Pb04	0.0608	160	< 160	<0.016

**Comments:** Small sample size (<0.05g) for samples 11420-Pb01 and 11420-Pb02.

Sampled by: Client

Analyzed by: Ruth Schumaker

Reviewed by: Nick Ly

Date Analyzed: 10/07/2020

Date Issued: 10/07/2020

Nick Ly, Technical Director

mg/ Kg =Milligrams per kilogram

Percent = Milligrams per kilogram / 10000

Note : Method QC results are acceptable unless stated otherwise.

Unless otherwise indicated, the condition of all samples was acceptable at time of receipt.

RL = Reporting Limit

'<' = Below the reporting Limit

Bench Run No: 2020-1007-6

FAA-02

# LEAD LABORATORY SERVICES



**Company** EHS International  
**Address** 1011 SW Klickitat Way, Suite 104  
 Seattle, WA 98134  
**Project Manager** Mr. David Braungardt  
**Phone** (206) 381-1128  
**Cell** (206) 510-8305  
**NVL Batch Number** 2016395.00  
**TAT** 5 Days **AH** No  
**Rush TAT**  
**Due Date** 10/8/2020 **Time** 8:00 AM  
**Email** davidb@ehsintl.com  
**Fax** (206) 254-4279

**Project Name/Number:** 11420-01 **Project Location:** ARC SeaTac City Hall

**Subcategory** Flame AA (FAA)

**Item Code** FAA-02 EPA 7000B Lead by FAA <paint>

**Total Number of Samples** 4

**Rush Samples**

	Lab ID	Sample ID	Description	A/R
1	20105657	11420-Pb01		A
2	20105658	11420-Pb02		A
3	20105659	11420-Pb03		A
4	20105660	11420-Pb04		A

	Print Name	Signature	Company	Date	Time
<b>Sampled by</b>	Client				
<b>Relinquished by</b>	Drop Box				

Office Use Only	Print Name	Signature	Company	Date	Time
<b>Received by</b>	Kelly AuVu		NVL	10/1/20	800
<b>Analyzed by</b>	Ruth Schumaker		NVL	10/7/20	
<b>Results Called by</b>					
<input type="checkbox"/> Faxed <input type="checkbox"/> Emailed					

**Special Instructions:**

Date: 10/1/2020  
 Time: 9:36 AM  
 Entered By: Kelly AuVu

**NVL Laboratories, Inc.**

4708 Aurora Ave N, Seattle, WA 98103  
 Tel: 206.547.0100 Emerg. Pager: 206.344.1878  
 Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

**CHAIN of CUSTODY  
SAMPLE LOG****2016395**

HAZARDOUS MATERIALS SERVICES

Client EHS International, Inc.Street 1011 SW Klickitat Way  
Suite 104Seattle, WA 98134Project Manager David BProject Location ARC Seatac City Hall

NVL Batch Number \_\_\_\_\_

Client Job Number 11420-01Total Samples 4
 Turn Around Time ☐ 1-Hr ☐ 24-Hrs ☐ 4 Days  
☐ 2-Hrs ☐ 2 Days ☒ 5 Days  
☐ 4-Hrs ☐ 3 Days ☐ 6 to 10 Days

Please call for TAT less than 24 Hrs

Email address Sunny J @ehsintl.comJoel W @ehsintl.com

Phone: (206) 381-1128 Fax: (206) 254-4279

<input type="checkbox"/> Asbestos Air	<input type="checkbox"/> PCM (NIOSH 7400)	<input type="checkbox"/> TEM (NIOSH 7402)	<input type="checkbox"/> TEM (AHERA)	<input type="checkbox"/> TEM (EPA Level II)	<input type="checkbox"/> Other _____
<input type="checkbox"/> Asbestos Bulk	<input type="checkbox"/> PLM (EPA/600/R-93/116)	<input type="checkbox"/> PLM (EPA Point Count)	<input type="checkbox"/> PLM (EPA Gravimetry)	<input type="checkbox"/> TEM Bulk	
<input type="checkbox"/> Mold/Fungus	<input type="checkbox"/> Mold Air	<input type="checkbox"/> Mold Bulk	<input type="checkbox"/> Rotometer Calibration		
<b>METALS</b>	<b>Inst./Det Limit</b>	<b>Matrix</b>	<b>RCRA Metals</b>	<input type="checkbox"/> All 8	<b>Other Metals</b>
<input checked="" type="checkbox"/> Total Metals	<input checked="" type="checkbox"/> FAA (ppm)	<input type="checkbox"/> Air Filter	<input type="checkbox"/> Arsenic (As)	<input type="checkbox"/> Mercury (Hg)	<input type="checkbox"/> All 3
<input type="checkbox"/> TCLP	<input type="checkbox"/> ICP (ppm)	<input type="checkbox"/> Drinking water	<input type="checkbox"/> Barium (Ba)	<input type="checkbox"/> Selenium (Se)	<input type="checkbox"/> Copper (Cu)
	<input type="checkbox"/> GFAA (ppb)	<input type="checkbox"/> Dust/wipe (Area)	<input type="checkbox"/> Cadmium (Cd)	<input type="checkbox"/> Silver (Ag)	<input type="checkbox"/> Nickel (Ni)
		<input type="checkbox"/> Soil	<input type="checkbox"/> Chromium (Cr)		<input type="checkbox"/> Zinc (Zn)
		<input checked="" type="checkbox"/> Paint Chips in %	<input checked="" type="checkbox"/> Lead (Pb)		
<input type="checkbox"/> Other Types of Analysis	<input type="checkbox"/> Fiberglass	<input type="checkbox"/> Nuisance Dust	<input type="checkbox"/> Other (Specify) _____		
	<input type="checkbox"/> Silica	<input type="checkbox"/> Respirable Dust			

Condition of Package: ☐ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

Seq. #	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1		<u>11420-P601</u>		
2		<u>11420-P602</u>		
3		<u>11420-P603</u>		
4		<u>11420-P604</u>		
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

	Print Below	Sign Below	Company	Date	Time
Sampled by	<u>Sunny J</u>	<u>JS</u>	EHSI	<u>9/30</u>	<u>8:00</u>
Relinquished by	<u>Sunny J</u>	<u>JS</u>	EHSI	<u>9/30</u>	<u>4:00</u>
Received by	<u>Joel W</u>	<u>JS</u>	<u>NVL</u>	<u>10/1/2020</u>	<u>8:00 PM</u>
Analyzed by					
Results Called by					
Results Faxed by					

**Special Instructions:** Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

Please e-mail results.

# **Appendix C**

## **Laboratory Certifications**

United States Department of Commerce  
National Institute of Standards and Technology



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## Certificate of Accreditation to ISO/IEC 17025:2017

---

NVLAP LAB CODE: 102063-0

**NVL Laboratories, Inc.**  
Seattle, WA

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:*

### **Asbestos Fiber Analysis**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).*

---

2020-07-23 through 2021-09-30

*Effective Dates*

A handwritten signature in blue ink, reading "Dana S. Laman".

---

*For the National Voluntary Laboratory Accreditation Program*

**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017**

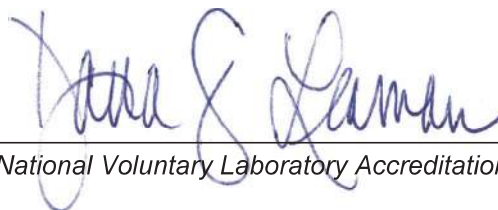
**NVL Laboratories, Inc.**  
4708 Aurora Avenue N.  
Seattle, WA 98103  
Mr. Nghiep Vi Ly  
Phone: 206-547-0100 Fax: 206-634-1936  
Email: [nick.l@nvllabs.com](mailto:nick.l@nvllabs.com)  
<http://www.nvllabs.com>

**ASBESTOS FIBER ANALYSIS**

**NVLAP LAB CODE 102063-0**

**Bulk Asbestos Analysis**

<u><b>Code</b></u>	<u><b>Description</b></u>
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials



*For the National Voluntary Laboratory Accreditation Program*





# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## Certificate of Accreditation

*Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:*

**NVL Laboratories**  
4708 Aurora Avenue North, Seattle, WA 98103

*(Hereinafter called the Organization) and hereby declares that Organization has met the requirements of ISO/IEC 17025:2017 "General Requirements for the competence of Testing and Calibration Laboratories" and the DoD Quality Systems Manual for Environmental Laboratories Version 5.3 February 2018 and is accredited in accordance with the:*

### United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP)

***This accreditation demonstrates technical competence for the defined scope:***  
***Environmental Testing***  
***(As detailed in the supplement)***

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Initial Accreditation Date:

April 8, 2012

Issue Date:

February 12, 2020

Expiration Date:

May 31, 2022

Accreditation No.:

72200

Certificate No.:

L20-90

Tracy Szerszen  
President/Operations Manager

Perry Johnson Laboratory  
Accreditation, Inc. (PJLA)  
755 W. Big Beaver, Suite 1325  
Troy, Michigan 48084

*The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: [www.pjilabs.com](http://www.pjilabs.com)*



# Certificate of Accreditation: Supplement

ISO/IEC 17025:2005 and DoD-ELAP

## NVL Laboratories

4708 Aurora Avenue North, Seattle, WA 98103  
Contact name: Nghiep Vi Ly Phone: 206-547-0100

*Accreditation is granted to the facility to perform the following testing:*

Matrix	Standard/Method	Technology	Analyte
Air	NIOSH 7300	ICP-AES	Arsenic
Air	NIOSH 7300	ICP-AES	Barium
Air	NIOSH 7300	ICP-AES	Cadmium
Air	NIOSH 7300	ICP-AES	Chromium
Air	NIOSH 7300	ICP-AES	Copper
Air	NIOSH 7300	ICP-AES	Lead
Air	NIOSH 7300	ICP-AES	Nickel
Air	NIOSH 7300	ICP-AES	Selenium
Air	NIOSH 7300	ICP-AES	Silver
Air	NIOSH 7300	ICP-AES	Zinc
Air	NIOSH 7400	PCM	Asbestos
Air	NIOSH 7082	FAA	Lead
Solid	EPA 6010D	ICP-AES	Arsenic
Solid	EPA 6010D	ICP-AES	Barium
Solid	EPA 6010D	ICP-AES	Cadmium
Solid	EPA 6010D	ICP-AES	Chromium
Solid	EPA 6010D	ICP-AES	Copper
Solid	EPA 6010D	ICP-AES	Lead
Solid	EPA 6010D	ICP-AES	Nickel
Solid	EPA 6010D	ICP-AES	Selenium
Solid	EPA 6010D	ICP-AES	Silver
Solid	EPA 6010D	ICP-AES	Zinc
Solid	EPA 7471B	CVAA	Mercury
Solid	EPA 600/M4-82/020	PLM	Asbestos
Solid	CARB M435	PLM	Asbestos
Solid	EPA 600/R-93/116	PLM	Asbestos
Solid	EPA 7000B	FAA	Lead

Matrix	Standard/Method	Technology	Analyte
Air	EPA 3051	Acid Digestion	Metals Digestion
Solid	EPA 3050B	Acid Digestion	Metals Digestion
Solid	EPA 1311	Leaching	TCLP

United States Department of Commerce  
National Institute of Standards and Technology



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## Certificate of Accreditation to ISO/IEC 17025:2005

---

NVLAP LAB CODE: 200768-0

**Seattle Asbestos Test, LLC**  
Lynnwood, WA

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for:*

### **BULK ASBESTOS FIBER ANALYSIS**

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2013-10-01 through 2014-09-30

*Effective dates*



A handwritten signature in black ink, appearing to read "William R. Mallory".

*For the National Institute of Standards and Technology*

# **Appendix D**

## **Selected Photographs of Asbestos Containing Materials**

## PHOTOGRAPHIC LOG

Limited Hazardous Materials Survey Report (Positive Asbestos Samples)  
SeaTac City Hall

PHOTOGRAPHIC LOG



**Photo 1—Sample 11420-F1-92:**  
Non-ACM 1'x1' Vinyl Tile over **brown fibrous material** on concrete **3% Chrysotile**



**Photo 2—Sample 11420-F1-92:**  
Wide shot



**Photo 3—Sample 11420-F1-124:**  
Non-ACM carpet over **black/yellow mastic** **6% Chrysotile**



**Photo 4—Sample 1142-F1-129:**  
Non-ACM blue fibrous cover over **yellow mastic** on wall (for blue fibrous panels)



## PHOTOGRAPHIC LOG

Limited Hazardous Materials Survey Report (Positive Asbestos Samples)  
SeaTac City Hall

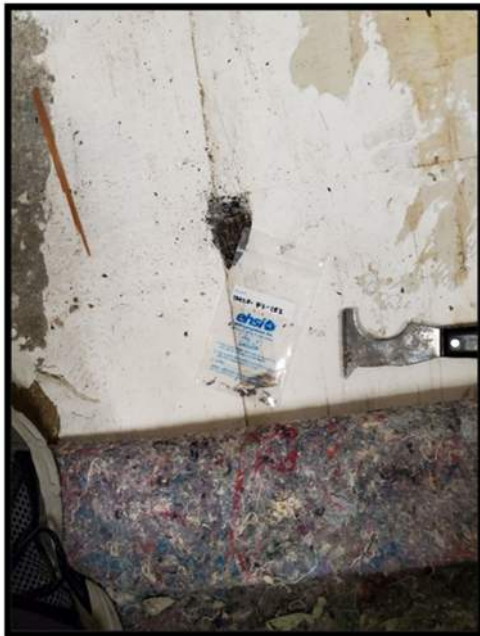
PHOTOGRAPHIC LOG



**Photo 5—Sample 11420-F2-145:**  
Non-ACM multi-colored carpet and adhesive over **yellow mastic** on concrete **5% Chrysotile**



**Photo 6—Sample 11420-F2-151:** Non-ACM multi-colored carpet and leveling compound over **white VAT** **7% Chrysotile** and **black mastic 10% Chrysotile**



**Photo 7—Sample 11420-F2-152:** Non-ACM multi-colored carpet and leveling compound over **white Vinyl Asbestos Tile** **7% Chrysotile** and **black mastic 10% Chrysotile**



**Photo 8—Sample 11420-F2-173:** Non-ACM **Gray vinyl tile**, **yellow mastic**, over **white vinyl tile** and **black mastic 3-4% Chrysotile**



## PHOTOGRAPHIC LOG

Limited Hazardous Materials Survey Report (Positive Asbestos Samples)  
SeaTac City Hall

PHOTOGRAPHIC LOG



**Photo 9—Sample 11420-F2-174:**  
Non-ACM gray vinyl tile, yellow mastic,  
over white vinyl tile and black mastic 3-  
4% Chrysotile



**Photo 10—Sample 11420-R-254:**  
White flex paper (on AHU top side &  
corners) 2% Chrysotile



**Photo 11—Sample 11420-R-255:**  
Black flex duct (on AHU unit) 8% Chrys-  
otile



**Photo 12—Sample 11420-R-260:**  
Non-ACM white flex paper on over red  
mastic (on AHU top side & corner) 6%  
Chrysotile

## PHOTOGRAPHIC LOG

Limited Hazardous Materials Survey Report (Positive Asbestos Samples)  
SeaTac City Hall

PHOTOGRAPHIC LOG



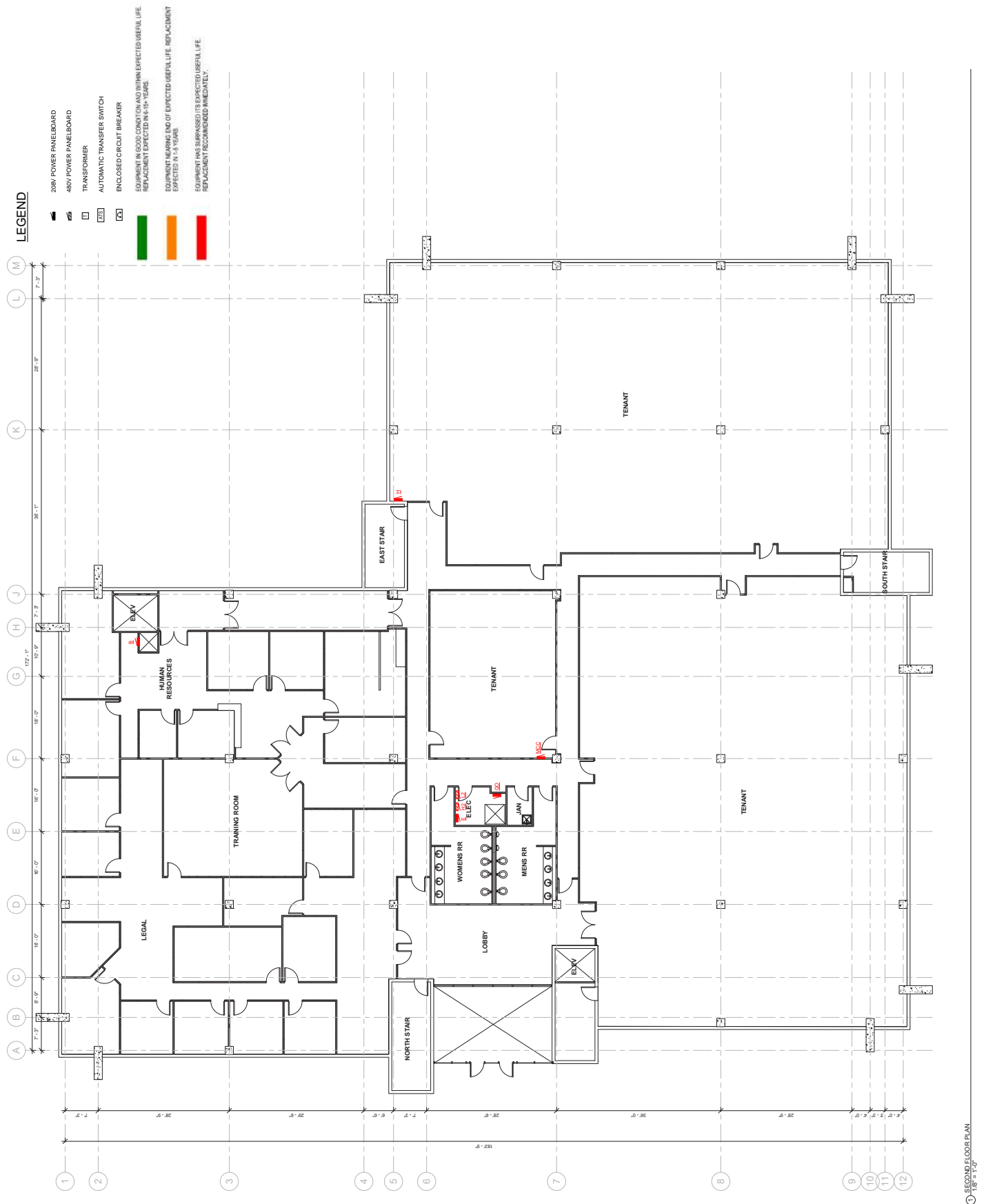
**Photo 13—Sample 11420-R-265:**  
Non-ACM white flex paper over red mas-  
tic 6% Chrysotile



**Photo 14—Sample 11420-R-265:**  
Wide Shot

## *APPENDIX I*



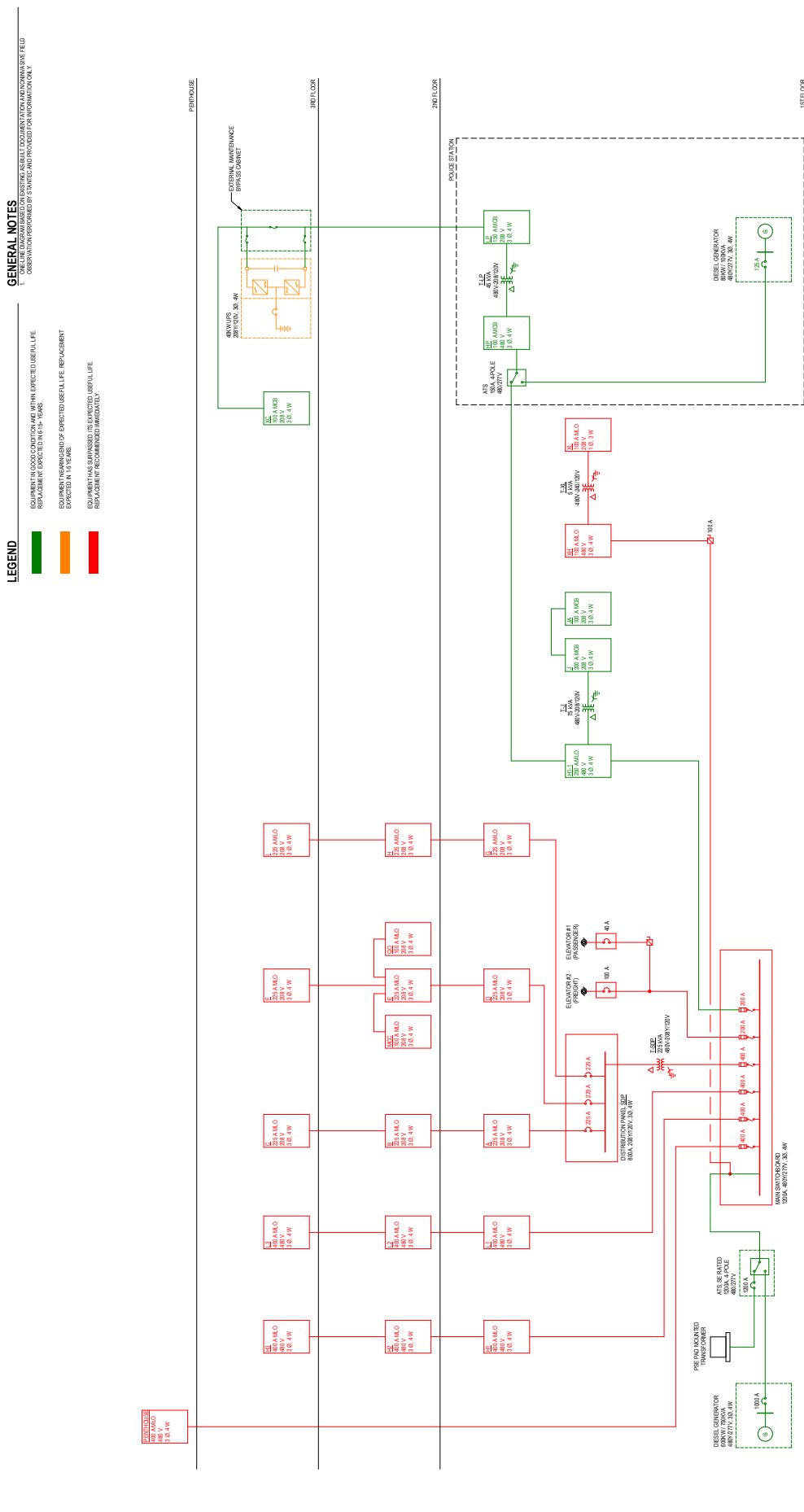


March 2021

# SEATAC CITY HALL ASBUILT PANEL LOCATIONS & ELECTRICAL ONE-LINE DIAGRAM







## *APPENDIX J*

## **Appendix A – Supporting Codes and Standards**

- ANSI/NECA/BICSI 568-Standard for Installing Commercial Building Telecommunications Cabling
- ANSI/BICSI 005-Electronic Safety and Security (ESS) System Design and Implementation Best Practices
- ANSI/NECA/BICSI 607-Telecommunications Bonding and Grounding Planning and Installation Methods for Commercial Buildings
- Telecommunication Distribution Methods Manual (TDMM)
- Information Technology Systems Installation Methods Manual (ITSIMM)
- ECIA EIA/ECA 310-E (2005) Cabinets, Racks, Panels, and Associated Equipment
- NECA/BICSI 568- Standard for Installing Building Telecommunications Cabling
- NSI/NEMA WC 66 (2013) Performance Standard for Category 6 and Category 7 100 Ohm Shielded and Unshielded Twisted Pairs
- NEMA Standards Publication VE 2-2006 Cable Tray Installation Guidelines
- TIA-568.0-D Generic Telecommunications Cabling for Customer Premises
- TIA-568.1-D Commercial Building Telecommunications Cabling Standard
- TIA-568.2-D Balanced Twisted-Pair Telecommunications Cabling and Components Standards
- TIA-568.3-D Optical Fiber Cabling Components Standard
- TIA-569-E Commercial Building Standard for Telecommunications Pathways and Spaces
- TIA-606-C Administration Standard for the Telecommunications Infrastructure
- TIA-607-D Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
- TIA-758-B: Customer-owned Outside Plant Telecommunications Infrastructure Standard
- TIA-455-C – Fiber Optic Test Standards
- TIA-526-7-A: Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
- TIA-526-14-C: Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant
- TIA-942-A: Telecommunications Infrastructure Standard for Data Centers
- TIA: Technical Service Bulletins (TSBs related to the above TIA/EIA standards)

## *APPENDIX K*

Abbreviation	Definition
<b>AHU</b>	Air Handling Unit
<b>ASHRAE</b>	American Society of Heating, Refrigerating and Air-Conditioning Engineers
<b>CHW</b>	Chilled Water
<b>DX</b>	Direct Expansion
<b>ECM</b>	Energy Conservation Measure
<b>EF</b>	Exhaust Fan
<b>FIM</b>	Facility Improvement Measure
<b>GPF</b>	Gallons Per Flush
<b>GPM</b>	Gallons Per Minute
<b>HVAC</b>	Heating, Ventilation, and Air Conditioning
<b>HP</b>	Horsepower
<b>HW</b>	Hot Water
<b>kW</b>	Kilowatt
<b>NFPA</b>	National Fire Protection Association
<b>OSA</b>	Outside Air
<b>PRV</b>	Pressure-Reducing Valves
<b>RPBP</b>	Reduced-Pressure Backflow Preventer
<b>W/SQFT</b>	Watts Per Square Foot
<b>WSEC</b>	Washington State Energy Code
<b>WSHP</b>	Water Source Heat Pump
<b>VFD</b>	Variable Frequency Drive

## *APPENDIX L*



## Appendix A: ASHRAE Equipment Life Expectancy Chart

### ASHRAE Equipment Life Expectancy chart

ASHRAE is the industry organization that sets the standards and guidelines for most all HVAC-R equipment.  
For additional info about ASHRAE the website is [www.ashrae.org](http://www.ashrae.org).

Equipment Item	Median Years	Equipment Item	Median Years	Equipment Item	Median Years
Air conditioners		Air terminals		Air-cooled condensers	20
Window unit	10	Diffusers, grilles, and registers	27	Evaporative condensers	20
Residential single or Split Package	15	Induction and fan coil units	20	Insulation	
Commercial through-the wall	15	VAV and double-duct boxes	20	Molded Blanket	20
Water-cooled package	15	Air washers	17		24
Heat Pumps		Ductwork	30	Pumps	
Residential air-to-air	15	Dampers	20	Base-mounted	20
Commercial air-to-air	15	Fans		Pipe-mounted	10
Commercial water-to-air	19	Centrifugal	25	Sump and well	10
Roof-top air conditioners		Axial	20	Condensate 15	
Single-zone	15	Propeller	15	Reciprocating engines	20
Multi-zone	15	Ventilating roof-mounted	20	Steam turbines	30
Boilers, hot water (steam)		Coils		Electric motors	18
Steel water-tube	24 (30)	DX, water, or steam	20	Motor starters	17
Steel fire-tube	25 (25)	Electric	15	Electric transformers	30
Cast iron	35 (30)	Heat Exchangers		Controls	
Electric	15	Shell-and-tube	24	Pneumatic	20
Burners	21	Reciprocating compressors	20	Electric	16
Furnaces		Packaged chillers		Electronic	15
Gas- or oil-fired	18	Reciprocating	20	Valve actuators	
Unit heaters		Centrifugal	23	Hydraulic	15
Gas or electric	13	Absorption	23	Pneumatic	20
Hot water or steam	20	Cooling towers		Self-contained	10
Radiant Heaters		Galvanized metal	20		
Electric	10	Wood	20		
Hot water or steam	25	Ceramic	34		

## *APPENDIX M*

City Hall Major HVAC Equipment											
Equipment				Original			Age				
Equipment Tag	Location	Service	Make/Model	Model Information	Horse Power	Motor	Year Installed	Age	Expected Life	Difference	Notes
MAU-1	Roof	Building Ventilation	Trane Climate Changer 10	Belt driven supply fan with hydronic hot water coil. Motor horsepower and coil capacity unknown	Unknown	460V/3PH	1978 (approx.)	42	25	-17	
MAU-2	Roof	Building Ventilation	Trane Climate Changer 10	Belt driven supply fan with hydronic hot water coil. Motor horsepower and coil capacity unknown	Unknown	460V/3PH	1978 (approx.)	42	25	-17	
AHU-2	Roof	Building Ventilation and Exhaust	Trane Climate Changer 21	Belt driven supply and exhaust fan with hydronic hot water coil. Motor horsepower and coil capacity unknown. Hot water heat pump on exhaust stream to recovery heat to the condenser loop.	Unknown	460V/3PH	1978 (approx.)	42	25	-17	
B-1	Mechanical Penthouse	Condenser Loop	Weil-McLain CEW-128	436 MBH electric boiler	n/a	460V/3PH	2001	19	15	-4	
P-1	Mechanical Room	Condenser Loop	Armstrong 4280BF	Constant speed direct drive based mounted pump.	5	460V/3PH	1990 (approx.)	30	15	-15	
P-2	Mechanical Room	Condenser Loop	Armstrong 4280BF	Constant speed direct drive based mounted pump.	5	460V/3PH	1990 (approx.)	30	15	-15	Motor replacement 9/28/18
CT-1	Roof	Condenser Loop	Baltimore Aircoil VF1-072	Closed loop cooling tower	25	460V/3PH	2007	13	20	7	
PCT-1	Mounted to CT-1	Belt driven cooling tower circulation pump	Baltimore aircoil	Constant speed inline belt drive pump.	2	460V/3PH	2007	13	15	2	
HP-XXX	Plenum space of each floor	Comfort cooling within city hall space	ClimateMaster	Various water source heat pumps.	Various	265V/1	2003	17	19	2	
HP-XXX	Plenum space of each floor	Comfort cooling within city hall space	Fredrich	Various water source heat pumps.	Various	265V/1	1990	30	19	-11	
HPWH-1	Roof in exhaust stream of AHU-2	Condenser Loop	AO Smith	Heat pump water heater used for heat recovery into condenser loop	2	240V/1PH	2010 (approx.)	10	15	5	
CU-1/AC-1	Roof	3rd Floor Server Room	York H1RC048S25G	Split system for server room cooling	N/A	208V/3PH	2006 (approx.)	14	15	1	
CU-2/AC-2	Roof	3rd Floor Server Room	Fujitsu AQU42RLX	Split system for server room cooling	N/A	208V/3PH	2010	10	15	5	

## PHASING OF RECOMMENDED FIMS - CITY HALL

DESCRIPTION	Year(s)												
	2021	2025	2030	2036	2040	2041	2045	2046	2051	2055	2059	2060	
M1: Replace Make Up Air Units and Air Handler	230							377					
M2: Replace Existing Ductwork	150											325	
M3: Replace Water Source Heat Pumps and Rezone	560	238		1163						1694			
M4: Replace Condenser Loop Pumps and Install Variable Speed Drives	20					30							
M5: Replace Electric Boiler	30		40						54				
M6: Replace Server Room Split Systems	40		54						72				
M7: Refurbish Fluid Cooler in 7-10 years, Replace in 15-20		60				161							
P1: Replace Lavatory and Sink Faucets	40												
P2: Replace Water Closest and Flush Valves	40												
P3: Replace Existing Shower Heads													
P4: Increase Water Heating Temperature to 140°F													
P5: Replace Water Heater and Circulation Pump		12		15					20				
NOTE - YEARS THAT HAVE NO FIMs ARE OMITTED FROM THE TABLE	COST (THOUSANDS)												
	1110	250	60	94	1177	30	161	377	127	20	1694	325	
NOTE - COST ESCALATION IS BASED ON 2% INCREASE/YEAR													

## *APPENDIX N*

# Energy Cost Budget / PRM Summary

By FSi consulting engineers

Project Name:	Date: October 20, 2020
City:	Weather Data: Seattle, WA - Full Year

Note: The percentage displayed for the "Proposed/ Base %" column of the base case is actually the percentage of the total energy consumption.

\* Denotes the base alternative for the ECB study.

	* Alt-1 Baseline		Alt-2 Code Min Roof and Windo		Alt-3 Code Min Envelope		Alt-4 Code Min plus 10% window	
	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10^6 Btu/yr	Proposed / Base %
<b>Lighting - Conditioned</b>	1,236.6	43	479	1,236.6	100	479	1,236.6	100
<b>Space Heating</b>	748.1	26	893	203.0	27	630	171.9	23
<b>Space Cooling</b>	211.9	7	190	241.0	114	190	244.4	115
<b>Pumps</b>	14.4	1	7	15.8	110	7	16.1	112
<b>Heat Rejection</b>	40.4	1	26	45.1	111	26	45.9	114
<b>Fans - Conditioned</b>	183.0	6	54	148.2	81	48	144.0	79
<b>Receptacles - Conditioned</b>	435.5	15	126	435.5	100	126	435.5	100
<b>Total Building Consumption</b>	<b>2,869.9</b>			<b>2,325.1</b>			<b>2,294.4</b>	

* Alt-1 Baseline		Alt-2 Code Min Roof and Windo		Alt-3 Code Min Envelope		Alt-4 Code Min plus 10% window	
Total	Number of hours heating load not met Number of hours cooling load not met	Energy 10^6 Btu/yr	Cost/yr \$/yr	Energy 10^6 Btu/yr	Cost/yr \$/yr	Energy 10^6 Btu/yr	Cost/yr \$/yr
		0	0	0	0	0	0

* Alt-1 Baseline		Alt-2 Code Min Roof and Windo		Alt-3 Code Min Envelope		Alt-4 Code Min plus 10% window	
Electricity	Energy 10^6 Btu/yr	Cost/yr \$/yr	Energy 10^6 Btu/yr	Cost/yr \$/yr	Energy 10^6 Btu/yr	Cost/yr \$/yr	Energy 10^6 Btu/yr
	2,869.9	0	2,325.1	0	2,294.4	0	2,272.1
<b>Total</b>	<b>2,870</b>	<b>0</b>	<b>2,325</b>	<b>0</b>	<b>2,294</b>	<b>0</b>	<b>2,272</b>

Project Name: SEATAC CITY HALL, TRC  
Dataset Name:

TRACE® 700 v6.3.5 calculated at 05:40 PM on 10/20/2020  
Energy Cost Budget Report Page 1 of 1



# Energy Cost Budget / PRM Summary

By FSi consulting engineers

Project Name:	Date: October 20, 2020
City:	Weather Data: Seattle, WA - Full Year

Note: The percentage displayed for the "Proposed/ Base %" column of the base case is actually the percentage of the total energy consumption.

\* Denotes the base alternative for the ECB study.

	* Alt-1 Baseline			Alt-2 Code Minimum Walls R9-1			Alt-3 Code Minimum Roof R-38			Alt-4		
	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h
<b>Lighting - Conditioned</b>	1,236.6	43	479	1,236.6	100	479	1,236.6	100	479	1,236.6	100	479
<b>Space Heating</b>	748.1	26	893	712.5	95	866	428.1	57	777	392.2	52	740
<b>Space Cooling</b>	211.9	7	190	213.7	101	190	220.6	104	190	222.8	105	190
<b>Pumps</b>	14.4	1	7	14.6	102	7	14.3	99	7	14.6	101	7
<b>Heat Rejection</b>	40.4	1	26	40.9	101	26	41.0	101	26	41.5	103	26
<b>Fans - Conditioned</b>	183.0	6	54	179.7	98	53	164.6	90	51	160.7	88	50
<b>Receptacles - Conditioned</b>	435.5	15	126	435.5	100	126	435.5	100	126	435.5	100	126
<b>Total Building Consumption</b>	<b>2,869.9</b>			<b>2,833.5</b>			<b>2,540.6</b>			<b>2,503.8</b>		

	* Alt-1 Baseline			Alt-2 Code Minimum Walls R9-1			Alt-3 Code Minimum Roof R-38			Alt-4		
	Energy 10^6 Btu/yr	Cost/yr \$/yr	Peak kBtu/h	Energy 10^6 Btu/yr	Cost/yr \$/yr	Peak kBtu/h	Energy 10^6 Btu/yr	Cost/yr \$/yr	Peak kBtu/h	Energy 10^6 Btu/yr	Cost/yr \$/yr	Peak kBtu/h
<b>Total</b>	<b>2,870</b>	<b>0</b>		<b>2,834</b>	<b>0</b>		<b>2,541</b>	<b>0</b>		<b>2,504</b>	<b>0</b>	

	* Alt-1 Baseline			Alt-2 Code Minimum Walls R9-1			Alt-3 Code Minimum Roof R-38			Alt-4		
	Energy 10^6 Btu/yr	Cost/yr \$/yr	Peak kBtu/h	Energy 10^6 Btu/yr	Cost/yr \$/yr	Peak kBtu/h	Energy 10^6 Btu/yr	Cost/yr \$/yr	Peak kBtu/h	Energy 10^6 Btu/yr	Cost/yr \$/yr	Peak kBtu/h
<b>Electricity</b>	<b>2,869.9</b>	<b>0</b>		<b>2,833.5</b>	<b>0</b>		<b>2,540.6</b>	<b>0</b>		<b>2,503.8</b>	<b>0</b>	
<b>Total</b>	<b>2,870</b>	<b>0</b>		<b>2,834</b>	<b>0</b>		<b>2,541</b>	<b>0</b>		<b>2,504</b>	<b>0</b>	

Project Name: SEATAC CITY HALL, TRC  
Dataset Name: SEATAC CITY HALL, TRC

TRACE® 700 v6.3.5 calculated at 06:51 PM on 10/20/2020  
Energy Cost Budget Report Page 1 of 1

# Energy Cost Budget / PRM Summary

By FSi consulting engineers

Project Name:	Date: October 20, 2020
City:	Weather Data: Seattle, WA - Full Year

Note: The percentage displayed for the "Proposed/ Base %" column of the base case is actually the percentage of the total energy consumption.

\* Denotes the base alternative for the ECB study.

	* Alt-1 Baseline			Alt-2 Code Minimum Walls R9-1			Alt-3 Code Minimum Roof R-38			Alt-4		
	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtu/h
<b>Lighting - Conditioned</b>	1,236.6	43	479	1,236.6	100	479	1,236.6	100	479	1,236.6	100	479
<b>Space Heating</b>	748.1	26	893	505.6	68	732	402.7	54	836	360.9	48	811
<b>Space Cooling</b>	211.9	7	190	228.6	108	190	187.9	89	190	194.2	92	190
<b>Pumps</b>	14.4	1	7	15.9	110	7	13.0	90	7	13.5	94	7
<b>Heat Rejection</b>	40.4	1	26	44.2	109	26	37.1	92	26	38.3	95	26
<b>Fans - Conditioned</b>	183.0	6	54	168.2	92	52	151.9	83	48	150.1	82	48
<b>Receptacles - Conditioned</b>	435.5	15	126	435.5	100	126	435.5	100	126	435.5	100	126
<b>Total Building Consumption</b>	<b>2,869.9</b>			<b>2,634.5</b>			<b>2,464.6</b>			<b>2,429.1</b>		

Total	* Alt-1 Baseline			Alt-2 Code Minimum Walls R9-1			Alt-3 Code Minimum Roof R-38			Alt-4		
	Number of hours heating load not met	Number of hours cooling load not met		0	0		0	0		0	0	

Electricity	* Alt-1 Baseline			Alt-2 Code Minimum Walls R9-1			Alt-3 Code Minimum Roof R-38			Alt-4		
	Energy 10^6 Btu/yr	Cost/yr \$/yr		Energy 10^6 Btu/yr	Cost/yr \$/yr		Energy 10^6 Btu/yr	Cost/yr \$/yr		Energy 10^6 Btu/yr	Cost/yr \$/yr	
	2,869.9	0		2,634.5	0		2,464.6	0		2,429.1	0	
<b>Total</b>	<b>2,870</b>	<b>0</b>		<b>2,635</b>	<b>0</b>		<b>2,465</b>	<b>0</b>		<b>2,429</b>	<b>0</b>	

## *APPENDIX O*

**Project:** SeaTac City Hall Feasibility Study  
**Address:** 4800 S 188th St, SeaTac, WA 98188

**Date:** 24-Feb-21

**Estimate by:** W. Jones



DESCRIPTION	POLICE ADDITION, VESTIBULE			CITY HALL RENOVATION			GARAGE & SITEWORK			COMMENTS
	SQ. FT.	COST/SF	EXT.	SQ. FT.	COST/SF	EXT.	SQ. FT.	COST/SF	EXT.	
BUILDING OPTIONS:										
Police and Vestibule Additions										
Construction Costs	12,968	\$ 466.69	\$ 6,052,000							Construction cost, today's dollars Design, permit, WSST, FF+E, contingency
Soft Costs	-	45% \$	2,723,400							
Renovation, 1st										
Construction Costs				77,153	\$ 428.21	\$ 33,038,000				Same notes as above
Soft Costs				-	45% \$	14,867,100				
Subtotal	13,000	\$ 675.03	\$ 8,775,400	77,200	\$ 620.53	\$ 47,905,100	-	-	\$ -	
SITE DEVELOPMENT:										
Building Demolitions										
Site Preparation							5,000	\$ 6.00	\$ 30,000	Rough estimate; incl level 3 space
Vehicular Circulation Pavement / Stripping							12,968	\$ 5.00	\$ 64,840	Site demo, pad prep, cut and fill, TESC
Pedestrian Circulation Pavement							3,000	\$ 8.00	\$ 24,000	Asphalt patch, curbs, striping
Landscape and Irrigation							1,000	\$ 5.00	\$ 5,000	Walkways
Site Development / Fencing (L.F.)							1,000	\$ 6.00	\$ 6,000	Patch and restore, with irrigation
Storm Drainage							1,500	\$ 75.00	\$ 112,500	New 8' perimeter fence plus two gates
Rerouting of Existing Underground Utilities							12,968	\$ 3.00	\$ 38,904	Redirect flows, roof drains, misc
Water, Fire and Sanitary Sewer							12,968	\$ 4.00	\$ 51,872	Allowance at new footprint
Site Electrical and Comm							12,968	\$ -	\$ -	Assume new addition is served from existing
Subtotal Site							12,968	\$ 25.69	\$ 333,115	Assume new addition is served from existing
Site Soft Costs								45%	\$ 149,902	Sitework construction costs, todays dollars
Subtotal Site Project							12,968	\$ 37.25	\$ 483,016	Soft cost multiplier
PARKING GARAGE:										
Construction Costs				82,250	\$ 140.00	\$ 11,515,000				235 Stalls @ 350 SF per Stall, Above Grade
Soft Costs					45%	\$ 5,181,750				NOT INCLUDING SITEWORK OR PURCHASE
				82,250	\$ 203.00	\$ 16,696,750				Garage total project costs
PROJECT TOTALS										
	13,000	\$ 675.03	\$ 8,775,400	77,200	\$ 620.53	\$ 47,905,100	95,218	\$ 180.43	\$ 17,179,766	Construction Costs + Soft Costs
PROJECT GRAND TOTALS										
				90,200	\$ 818.85	\$ 73,860,000				Project Cost, All Buildings and Sitework

**Project:** SeaTac City Hall Feasibility Study  
**Address:** 4800 S 188th St, SeaTac, WA 98188

**Date:** 24-Feb-21

**Estimate by:** W. Jones



**Assumptions, Inclusions and Exclusions:**

**General:**

Costs are Construction Costs in Today's Dollars. Soft costs (design, permits, fees, FF & E, sales tax, construction contingency) are included 'below the line'. Escalation not included. The Owner should anticipate construction inflation at an annual rate of 3% from the present day to the construction mid point month.

The above are high-level budgetary estimates based upon programmatic information and limited knowledge of existing conditions or future design.

The construction is based upon one continuous operation under one general contract. The estimates assume working in a phased manner in the occupied building.

The estimate is based upon prices as of Feb 2021, with four to six responsible and responsive bids under a competitive bid environment for a fixed price contract.

A phasing factor of 10% is included with the renovation hard costs for the inefficiency to the General Contractor. Disruption to City Services is not part of the phasing factor or soft cost

**Civil and Site:**

**Site Areas Determined as Follows:**

Overall site area within boundary	127,105	Site-SF per Bluebeam
Less area of new building program	(12,968)	Per ARC program
Less footprint of existing building	(26,350)	Per floor plan
Remaining Site Area	87,787	Site-SF; see above for paving and landscape area

Site costs represent a low impact restoration. Most services to the new additions will pull from the existing city hall.

Parking garage total does not include offsite land purchase cost or sitework. No info available.

Assumed site materials and not contaminated.

For stormwater, no underground detention vault was assumed

## Building Cost Estimates

**Estimate Prepared by:** W. Jones

DESCRIPTION	POLICE AND VESTIBULE ADDITION			CITY HALL RENOVATION			COMMENTS
	SQ. FOOTAGE	COST/SF	EXT.	SQ. FOOTAGE	COST/SF	EXT.	
Building Size: 12,968 SF 77,153 SF							
Police Addition:							
Police Addition							
Police Addition, complete.....	6,335	\$	550.00	\$	3,484,250		Includes Green Roof 10,051 SF Total See Above Typically 10% at new
Sallyport.....	4,934	\$	350.00	\$	1,726,900		
Net-to-Gross.....	1,127	\$	400.00	\$	450,760		
Vestibule Addition:							
West Vestibule and Lobby							
Circulation.....	520	\$	700.00	\$	364,000		New West Vestibule Addition Typically 10% at new
Net-to-Gross.....	52	\$	500.00	\$	26,000		
Subtotal	12,968	\$	466.68	\$	6,051,910	-	\$ -

## CITY HALL RENOVATION:

## Primary

Lobby.....	7,475	\$	300.00	\$	2,242,500	lobbies at levels 1 and 2
Council Chambers.....	3,066	\$	400.00	\$	1,226,400	
Sessions.....	317	\$	400.00	\$	126,800	
Courtroom.....	3,091	\$	500.00	\$	1,545,500	includes courtrooms and offices
Offices.....	24,372	\$	225.00	\$	5,483,700	see "Dept Office Area" worksheet
Break Room.....	1,077	\$	225.00	\$	242,325	
Conference Center.....	5,286	\$	300.00	\$	1,585,800	variety of meeting rooms
Police.....	14,211	\$	275.00	\$	3,908,025	
Wellness.....	798	\$	275.00	\$	219,450	includes locker rooms, showers, bicycle storage
Circulation.....	4,487	\$	200.00	\$	897,400	corridors
Vertical Circulation.....	663	\$	-	\$	-	elevators and stairs; existing to remain; assume no work
Tenant.....	3,414	\$	-	\$	-	assume no TI work
<b>Support</b>						
Restrooms.....	2,428	\$	250.00	\$	607,000	includes men's/women's and janitor's closets
Electrical/Riser.....	547	\$	200.00	\$	109,400	
Server.....	334	\$	200.00	\$	66,800	
Records.....	1,179	\$	175.00	\$	206,325	
Storage.....	237	\$	150.00	\$	35,550	
Net-to-Gross.....	8,248	\$	150.00	\$	1,237,189	Wall cavity, vertical structure, shafts
<b>Lump Sums / Allowances</b>						
Reroofing incl demo and insulation.....	26,338	\$	20.00	\$	526,760	New membrane roof and riding insulation, per roof-SF
Skylight.....	2,460	\$	110.00	\$	270,600	New skylight with curb
Covered Outdoor Area, Level 3.....	2,372	\$	150.00	\$	355,800	Demo, reroofing, canopy or trellis, lighting
Seismic Upgrade.....	79,329	\$	75.00	\$	5,949,670	Shear walls, stiffening, foundations, per GSF
Floor Plate Cut Outs to Create Double Height Space.....	1,901	\$	75.00	\$	142,575	Demo, temp shoring, stiffen new floor openings
New Stair.....	1	\$	75,000	\$	75,000	New stair, rails, with demo, one flight
Bring Existing Stairs Up to Code - per flight.....	6	\$	15,000	\$	90,000	Adding metal screen to existing open risers



**Project:** SeaTac City Hall Feasibility Study  
**Address:** 4800 S 188th St, SeaTac, WA 98188

**Date:** 24-Feb-21

**Estimate Prepared by:** W. Jones

## Building Cost Estimates



DESCRIPTION	POLICE AND VESTIBULE ADDITION		CITY HALL RENOVATION				COMMENTS
	SQ. FOOTAGE	COST/SF	EXT.	SQ. FOOTAGE	COST/SF	EXT.	
Re-skin Building: 70% Siding, 30% Curtainwall Glazing.....				30,000	\$ 50.00	\$ 1,500,000	Demo, framing, insul, siding, glazing, per Avg Wall-SF
Mechanical Equipment Replacement.....				1	\$ 1,110,000	\$ 1,110,000	Scheduled equipment replacement per FSI estimate
Full Rezone and Replace Heat Pumps.....				1	\$ 238,000	\$ 238,000	Recommendation of FSI mechanical engineer
Hazardous Material Abatement - Mastic and Light Fixtures.....				1	\$ 36,000	\$ 36,000	1,100 SF mastic; 615 fluorescent fixtures, ROM from EHSI
Phasing, Shift Work, Productivity.....				10%	\$ 30,034,569	\$ 3,003,457	Phasing within occupied building, select overtime
<b>Subtotal</b>	<b>-</b>	<b>\$</b>	<b>-</b>	<b>\$ 77,153</b>	<b>\$ 428.21</b>	<b>\$ 33,038,026</b>	
<b>BUILDING MACC TOTALS</b>	<b>12,968</b>	<b>\$ 466.69</b>	<b>\$ 6,052,000</b>	<b>77,153</b>	<b>\$ 428.21</b>	<b>\$ 33,038,026</b>	<b>Estimated Building Construction Cost Total</b>
<b>SOFT COSTS*</b>		45%	\$ 2,723,400				<b>Design, Permits, Fess, WSST, FF+E, Contingency</b>
<b>BUILDING PROJECT TOTALS</b>	<b>12,968</b>	<b>\$ 676.70</b>	<b>\$ 8,775,400</b>	<b>77,153</b>	<b>\$ 620.91</b>	<b>\$ 47,905,137</b>	<b>Building Project Cost Total, 2021 Dollars, Each Building</b>

### Assumptions, Inclusions and Exclusions:

#### General:

The above building estimates do not include site costs. See the Summary sheet for sitework plus building costs.

The renovation costs per SF assume full gut and renovate. Structural and mechanical costs are included with the Lump Sums rather than with the program area section.

\*Costs are Constructions Costs in Today's Dollars. Soft costs (design, permits, fees, FF & E, sales tax, construction contingency, etc.) are included below the line.

PDA suggests the Owner carry 3% annual escalation from the present day to the mid point month of construction.

The above are high-level budgetary estimates based upon programmatic information and very limited knowledge of existing conditions or future design.

Building project total unit costs are expressed as a cost per building gross SF.

The construction is based upon one continuous operation under one general contract.

The estimate is based upon prices as of Feb, 2021, with four to six responsible and responsive bids under a competitive bid environment for a fixed price contract.

Initial impression is the renovation cost per SF is nearly as much as new building. However, the new cost / SF is skewed down by the Sallyport as over 40% of the area.

Room/Space	Total Size (NSF)	Use Description
<b>Primary - New</b>		
Police Addition	6,335	--
Police Sallyport Addition	4,934	sallyport and secured parking
Vestibule	520	new addition at main entrance
<b>Subtotal (NSF)</b>	<b>11,789</b>	<b>primary and support spaces</b>
Utilities	0	MEP rooms assumed included
<b>Net-to-Gross</b>	<b>1,179</b>	<b>typically 10% of subtotal. vertical structure, wall cavities</b>
<b>Total GSF New</b>	<b>12,968</b>	
<b>Primary - Renovation</b>		
Lobby	7,475	lobbies at levels 1 and 2
Council Chambers	3,066	--
Sessions	317	--
Courtroom	3,091	includes courtroom and offices
Offices	24,372	see "Dept Office Area" worksheet
Break Room	1,077	--
Conference Center	5,286	variety of meeting rooms
Police	14,211	--
Wellness	798	includes locker rooms, showers, bicycle storage
Circulation	4,487	corridors
Vertical Circulation	663	includes elevators and egress stairs; existing to remain; assume no work
Tenant	3,414	assume no TI work
<b>Support</b>		
Restrooms	2,428	includes mens/womens and janitor's closets
Electrical/Riser	547	--
Server	334	--
Records	1,179	--
Storage	237	--

Subtotal (NSF)	68,905	primary and support spaces only, excludes tenant space and vertical circulation
Utilities	0	MEP rooms included with Support
Net-to-Gross	8,248	typically 10 - 12% of subtotal - vertical structure, wall cavities
<b>Total GSF Renovation</b>	<b>77,153</b>	primary and support spaces only, excludes tenant space and vertical circulation
<b>Total GSF Existing Bldg</b>	<b>81,230</b>	Includes above plus tenant space and vertical circulation, for info
Exterior		
Green Roof	10,051	level 2, accessible to staff, with police addition
Covered Outdoor Area	2,372	level 3, requires partial demo of existing building
Subtotal	12,423	exterior spaces
<b>Total SF</b>	<b>102,544</b>	<b>includes interior renovation and exterior spaces and addition</b>

**Project:** SeaTac City Hall Feasibility Study  
**Address:** 4800 S 188th St, SeaTac, WA 98188

**Date:** 10-Feb-21

**Estimate Prepared by:** W. Jones



## Building Cost Estimates

DESCRIPTION	POLICE AND VEST. ADDITION, NO SALLYPORT			CITY HALL RENOVATION			COMMENTS
	SQ. FOOTAGE	COST/SF	EXT.	SQ. FOOTAGE	COST/SF	EXT.	

**Building Size:** 7,541 SF      77,153 SF

### Police Addition:

#### Police Addition

Police Addition, complete.....	6,335	\$ 550.00	\$ 3,484,250
Sallyport none.....	-	\$ 350.00	\$ -
Net-to-Gross.....	634	\$ 400.00	\$ 253,400
	<b>6,969</b>	<b>\$ 536.36</b>	<b>\$ 3,737,650</b>

### Vestibule Addition:

#### West Vestibule and Lobby

Circulation.....	520	\$ 700.00	\$ 364,000
Net-to-Gross.....	52	\$ 500.00	\$ 26,000

**Subtotal**

	<b>7,541</b>	<b>\$ 547.40</b>	<b>\$ 4,127,650</b>
--	--------------	------------------	---------------------

	-		\$ -
--	---	--	------

### CITY HALL RENOVATION:

#### Primary

Lobby.....	7,475	\$ 300.00	\$ 2,242,500	lobbies at levels 1 and 2
Council Chambers.....	3,066	\$ 400.00	\$ 1,226,400	
Sessions.....	317	\$ 400.00	\$ 126,800	
Courtroom.....	3,091	\$ 500.00	\$ 1,545,500	includes courtrooms and offices
Offices.....	24,372	\$ 225.00	\$ 5,483,700	see "Dept Office Area" worksheet
Break Room.....	1,077	\$ 225.00	\$ 242,325	variety of meeting rooms
Conference Center.....	5,286	\$ 300.00	\$ 1,585,800	
Police.....	14,211	\$ 275.00	\$ 3,908,025	includes locker rooms, showers, bicycle storage
Wellness.....	798	\$ 275.00	\$ 219,450	corridors
Circulation.....	4,487	\$ 200.00	\$ 897,400	elevators and stairs; existing to remain; assume no work
Vertical Circulation.....	663	\$ -	\$ -	assume no TI work
Tenant.....	3,414	\$ -	\$ -	

#### Support

Restrooms.....	2,428	\$ 250.00	\$ 607,000	includes men's/women's and janitor's closets
Electrical/Riser.....	547	\$ 200.00	\$ 109,400	
Server.....	334	\$ 200.00	\$ 66,800	
Records.....	1,179	\$ 175.00	\$ 206,325	
Storage.....	237	\$ 150.00	\$ 35,550	
Net-to-Gross.....	8,248	\$ 150.00	\$ 1,237,189	Wall cavity, vertical structure, shafts
<b>Lump Sums / Allowances</b>				
Reroofing incl demo and insulation.....	26,338	\$ 20.00	\$ 526,760	New membrane roof and riding insulation, per roof-SF
Skylight.....	2,460	\$ 110.00	\$ 270,600	New skylight with curb
Covered Outdoor Area, Level 3.....	2,372	\$ 150.00	\$ 355,800	Demo, reroofing, canopy or trellis, lighting
Seismic Upgrade.....	79,329	\$ 75.00	\$ 5,949,670	Shear walls, stiffening, foundations, per GSF
Floor Plate Cut Outs to Create Double Height Space.....	1,901	\$ 75.00	\$ 142,575	Demo, temp shoring, stiffen new floor openings
New Stair.....	1	\$ 75,000	\$ 75,000	New stair, rails, with demo, one flight

## Building Cost Estimates

**Estimate Prepared by:** W. Jones

DESCRIPTION	POLICE AND VEST. ADDITION, NO SALLYPORT			CITY HALL RENOVATION			COMMENTS
	SQ. FOOTAGE	COST/SF	EXT.	SQ. FOOTAGE	COST/SF	EXT.	
Re-skin Building; 70% Siding, 30% Curtainwall Glazing.....				30,000	\$ 50.00	\$ 1,500,000	Demo, framing, insul, siding, glazing, per Avg Wall-SF
Mechanical Equipment Replacement.....				1	\$ 1,110,000	\$ 1,110,000	Scheduled equipment replacement per FSI estimate
Phasing, Shift Work, Productivity.....				10%	\$ 23,670,569	\$ 2,967,057	Phasing within occupied building, select overtime
<b>Subtotal</b>	-		\$ -	<b>\$ 77,153</b>	<b>\$ 423.03</b>	<b>\$ 32,637,626</b>	
<b>BUILDING MACC TOTALS</b>	<b>7,541</b>	<b>\$ 547.44</b>	<b>\$ 4,128,000</b>	<b>77,153</b>	<b>\$ 423.03</b>	<b>\$ 32,637,626</b>	<b>Estimated Building Construction Cost Total</b>
<b>SOFT COSTS*</b>							<b>Design, Permits, Fess, WSST, FF+E, Contingency</b>
<b>BUILDING PROJECT TOTALS</b>	<b>7,541</b>	<b>\$ 793.79</b>	<b>\$ 5,985,600</b>	<b>77,153</b>	<b>\$ 613.39</b>	<b>\$ 47,324,557</b>	<b>Building Project Cost Total -2021 Dollars, Each Building</b>

## Assumptions, Inclusions and Exclusions:

**General:**

The above building estimates do not include site costs. See the Summary sheet for sitework plus building costs.

The renovation costs per SF assume full gut and renovate. Structural and mechanical costs are included with the Lump Sums rather than with the program area section.

\*Costs are Constructions Costs in Today's Dollars. Soft costs (design, permits, fees, FF & E, sales tax, construction contingency, etc.) are included below the line.

PDA suggests the Owner carry 3% annual escalation from the present day to the mid point month of construction.

The above are high-level budgetary estimates based upon programmatic information and very limited knowledge of existing conditions or future design.

Building project total unit costs are expressed as a cost per building gross SF.

The construction is based upon one continuous operation under one general contract.

The estimate is based upon prices as of Feb, 2021, with four to six responsible and responsive bids under a competitive bid environment for a fixed price contract.

Initial impression is the renovation cost per SF is nearly as much as new building. However, the new cost / SF is skewed down by the Sallyport as over 40% of the area.

## Matthew Philbrook

---

**From:** Ellaine Wi <ewi@seatacwa.gov>  
**Sent:** Friday, February 19, 2021 11:54 AM  
**To:** Tim Ramsaur  
**Cc:** Mary Mirante Bartolo  
**Subject:** FW: [EXT] - MRSC Inquiry: Physical requirements for records storage

Hi, Tim.

Below is the information I received from MRSC regarding the requirements for a possible buildout for a new Records Room. We may have to reach out to Fire regarding the fire rating recommendation for such a room. Kristina said they provided a specific fire rating when the room downstairs was built, but it's been so long that she no longer has the information. Given the amount of time that's passed, it might be better to get new information anyway. Also, considering that the Records Room could possibly move from the 1st to the 3rd floor, Zee mentioned that some thought should be given to the weight capacities of the third floor structure.

If you need any other information, please let me know.

Thank you.



**Ellaine Wi**  
**Legal Analyst**  
Legal

**o:** 206.973.4640 **c:** 206.561.6790 **f:** 206.838.7223



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**From:** Hilton, Charles <charles.hilton@sos.wa.gov>  
**Sent:** Thursday, February 18, 2021 1:18 PM  
**To:** Ellaine Wi <ewi@seatacwa.gov>  
**Subject:** RE: [EXT] - MRSC Inquiry: Physical requirements for records storage

Hi Ellaine,

That's a very good question but the simple answer is there are no requirements. However, we can provide some recommendations with creating a records room. I'll first assume this is a room within an already established building. There are a few things to consider when making a records space: environmental control, fire protection, security, and storage conditions.



Obviously with environmental controls you are going to want to keep the records out of the elements (dry and cool) and away from pests. Eating and drinking should be prohibited in the records room. Intake vents should be screened. Monitoring for pests, like with insect traps, is helpful to make sure the records continue to be safe.

In terms of fire protection, minimizing the risk for fire is essential. Fire rated walls, doors, ceilings, and floors are preferable. Keep other combustible material, like wood shelving and furniture, out of the storage room. Fire detection should be present in the room, specifically ones that automatically alert the fire department. Automatic sprinkler systems are preferred in records rooms; in this regard, dry pipe systems are favored to prevent any potential leaking.

The records room should be a secure room, only available to those who need access to the records stored inside.

With storage conditions, we have an advise sheet on [Selecting Appropriate Shelving for Records Storage](#) that should help. This advice sheet discusses shelving materials, load capacities, and sizing with relation to the size of boxes. We also having an advice sheet on the [Benefits of Using Washington State Archives' Boxes](#) which might help you choose appropriate shelving as well.

I hope this information helps. Please let me know if you have any more questions.

Thanks,

Charles

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**From:** Ellaine Wi [<mailto:ewi@seatacwa.gov>]

**Sent:** Thursday, February 18, 2021 11:00 AM

**To:** Archives - Records Management <[recordsmanagement@sos.wa.gov](mailto:recordsmanagement@sos.wa.gov)>

**Subject:** FW: [EXT] - MRSC Inquiry: Physical requirements for records storage

Hello.

I recently submitted an inquiry to MSRC. They advised that I reach out to Washington State Archives to see if there are any standards and recommendations with building out a records room.

Any assistance or direction would be much appreciated.

Thank you.



**Ellaine Wi**

**Legal Analyst**

Legal

**o:** 206.973.4640 **c:** 206.561.6790 **f:** 206.838.7223



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**From:** Steve Gross

**Sent:** Thursday, February 18, 2021 9:10 AM

**To:** Ellaine Wi

**Subject:** [EXT] - MRSC Inquiry: Physical requirements for records storage

Ellaine,

You submitted the following inquiry: Are there any specific requirements when building out a space for a records room (e.g. the need to fire proof the room, etc.)? Thank you.

Response:

MRSC is unaware of any law or regulation that provides for specific physical building requirements. Generally, the records must be accessible, secure, protected from degradation, and you should have access control so that you know who has been in the building.

Specific statutes may require certain types of records to be maintain separately or have even more limited access. For example health (RCW [70.02.150](#)). For law enforcement records, the Criminal Justice Information Systems [Law Enforcement Records Management Systems \(RMSs\)](#) require you to limit access to persons who are qualified to access the system.

It may be best to contact the Washington State Archives for their suggestions depending on the types of records being stored. They can be reached at (360) 586-1492 or by email at [recordsmanagment@sos.wa.gov](mailto:recordsmanagment@sos.wa.gov). Another option to see what agencies are using for best practices would be to ask your city clerk to check with the [Washington State Municipal Clerk's Association](#).

I hope this is helpful. Please let me know if you have other questions.

Steve

**Steve Gross (he/him)**

Legal Consultant

206.625.1300 x128

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