Introduction

The original Fourth Avenue Building (FAB) was apparently constructed in 1962, consisting of a 200 x 200, two-story office building with a basement. This portion of the structure is designated “Computer Sciences Building” on the attached drawings. In 1974 a two-level parking garage was added to the building [“Parking P1,” and “Parking P2” in the attached drawings, above the parking levels was an office level, also below grade [“Lower Level”]; and a small above-ground structure, presumably used for office space. This smaller above-ground structure no longer exists. In 1998, Appeals were approved for the construction of a 7-story office high-rise, which has been used for the Development Services offices for the City of Portland. In 2004, Appeals were approved for the construction of a 5-story office/classroom structure, currently known as the Fariborz Maseeh College of Engineering and Computer Science. The entire structure is connected below grade, as shown in the attached perspective versions of the building layouts. The entire basement structure has an area of approximately 300,000sf.

This Life Safety Summary has been created in order to answer two primary questions:
1. Are unrated Corridors permitted on the Lower Level of the building?
2. Is the building, and its Appeal history, generally in compliance with the International Building Code model currently in use?

Appeal History [See attached Appeal Summary and supplemental drawings]

A 1963 Building Code Appeal refers to a 1962 Building Code Appeal that addressed the installation of a specific Armstrong suspended ceiling assembly; one that provided, by its listing, the required Two-hour protection of the Structural Frame required for Type I building. Presumably [the 1962 Appeal does not appear to be in the Appeal records for 1900 SW 4th], this Appeal permitted unprotected- or partially-protected framing materials in the oldest portion of the building [Computer Sciences Building]. This ceiling product is no longer in production, and has probably been replaced over the life of the FAB. From a pragmatic standpoint, the Appeal approval was probably unwise, since there did not appear to be any on-site stipulations preventing the replacement of the ceiling with other materials.

An Appeal narrative from 1985 states, “when the original portion of this building was constructed in 1963, neither the structural beams nor the floor assembly were fire-protected”. This is inaccurate; however 20 years after the original Appeal approval it either wasn’t clear that the suspended ceiling system provided Two-hour fire protection for the Structural Frame; or more likely, the original Armstrong ceiling had been replaced by more contemporary ceiling systems. My guess is that the original Armstrong ceiling product
contained a large amount of asbestos, and was later removed from the market for environmental health reasons.

The result of the 1985 Appeal was a stipulation that an Area Separation Wall be constructed to separate the original structure from subsequent additions to the building. The construction of a Four-hour Area Separation Wall effectively creates a separate “building” in terms of Code compliance. The door openings in this Area Separation Wall [Fire Wall in the IBC model] are considered “Horizontal Exits.” In conjunction with the 1985 Appeal were approvals for the construction of unrated corridors, providing that the corridor ceiling assemblies were supplemented with mineral wool batts above the ceiling line, to reduce the possibility of flame spread. Subsequent Appeal approvals expanded the extent of the unrated corridor construction; however, a description of the specific locations within the earlier FAB building, where unrated corridors are permitted, was never placed in the Appeal record. In order to retain a consistent appearance throughout the Computer Science Building, Portland State University wishes to use unrated corridors throughout the building.

Appeals in 1998 approved the construction of the Development Services Building; a 7-story, Type I, High-Rise [with the exception of an Appeal-approved lack of secondary water supply for the sprinklers]; constructed on top of the existing three-level basement. Type I buildings are allowed by Code to have an Unlimited Area, so the attachment of the Development Services Building to the existing basement below is permitted by Code. The Development Services Building has a fairly sophisticated smoke evacuation/smoke removal system, which helps provide an “alternate means of protection” in lieu of protected corridor construction in large portions of the building. The Appeal permits open stair and elevator shafts in the above ground portion of the structure, and elevator penetrations into the parking garages, without having elevator lobby protection. During the Appeal process for the construction of the Development Services Center, the Four-hour Area Separation Wall was ‘downgraded’ to a Two-hour Area Separation Wall. This decision was probably in error. Consequently, at the Plaza Level of the building, the existing doors forming the Horizontal Exit have a 120-minute rating instead of a 180-minute rating. Given the nature of the Life Safety systems incorporated into the Development Services Center, this downgrading is probably justified.

A 1974 Building Code Appeal addresses the fact that the automobile ramp penetrates all three levels of the basement structure, without Code-required shaft construction. The construction was approved, based on the installation of sprinklers and mechanical ventilation. The same Appeal addressed the area currently called [L000-01], which is being used as a study area in the Lower Level of the building. A monumental stairway leads up to the Plaza Level of the Development Services Building. It appears from the Appeal narrative, that [L000-01] once contained a food service establishment and adjacent eating areas. The Appeal approved an unprotected opening between the Lower Level and the floor above; and a lack of separation from the adjacent Corridors. However, that Appeal approval does not appear to have been written with the idea that a high-rise building would be constructed immediately above the dining area. Consequently, I believe that this Appeal approval is no longer valid. A Two-hour Fire Barrier, with doors on magnetic hold-opens, now separates this area from the Plaza Level above.

The Engineering Building was constructed as a Type I, sprinklered structure; with a 5-story atrium beginning at the Plaza Level, and an extension of the atrium into the Lower Level. A 2004 Building Code Appeal permits the creation of a 5-story atrium beginning at the Plaza Level. Its extension into the Lower Level, using glazed smoke curtains, enhanced
sprinkler protection and a smoke removal system, as alternate means of protection, was
denied because there wasn't enough information regarding smoke removal from the
basement. However, an additional smoke removal system was designed; enabling the
construction of the atrium's extension into the Lower Level.

The atrium extension into the Lower Level is bounded by a glazed wall at the corridor,
and includes an elevator shaft to the floors above. The Lower Level atrium is also connected
to adjacent offices by means of a 20-minute rated door into a Hallway; and an unrated door
into an office. The plans submitted with the Appeal show a specific note regarding glazing
in the Corridor, protected by sprinkler heads. The Appeal narrative proposed that the
quick-response sprinkler heads within the atrium were to be installed per I Occupancy
standards; as a means of alternate protection. The atrium isn't considered part of the
Means of Egress at the Lower Level.

The 2004 Building Code Appeal also permits:
- The retention of the existing garage ventilation system, which was tested and found
to comply with CO limitation levels, even though it does not provide the volume of air
movement required by the 2003 IMC.
- Common exhaust systems for laboratory spaces located in various parts of the
building;
- The extensions of fixed benches into the building's corridor system, since the benches
are located beyond the required egress width for the building.

**Conclusion**

- Are unrated Corridors permitted on the Lower Level of the building? Yes.

  To quote the 2000 IBC Handbook: "In a fully sprinklered building, a fire-resistance-rated
corridor is only required in Groups H, R, I-1 and I-3." Consequently the proposed improvements
to the Lower Level spaces do not require rated Corridor construction; and are permitted
glass walls and doors, consistent with the construction occurring in the rest of the
Computer Sciences Building.

- Is the building generally in compliance with the International Code model? Yes.

  The Type I portion of the structure appears to be adequately separated from the Type II
portions of the building. As work in along the Area Separation Wall continues in the future,
attention should be paid to any ductwork that penetrates the Area Separation Wall; and
180-minute Combination Smoke/Fire dampers need to be installed, if absent.

  Under the IBC Code model, the parking garages are classified as “Incidental Uses” that
serve the adjacent B Occupancy spaces above [OSSC 508.2.1]. The required separation is
either Two-hour rated construction; or One-hour rated construction and the installation of
automatic sprinklers. The existing construction complies with the latter requirement.

Respectfully Submitted,

Marty Jones

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*Marty Jones is an ICC-certified and State of Oregon-licensed Plans Examiner and Structural Inspector, with 14 years of experience working for the City of Portland as a Building Plans Examiner.*

*MJ Arts was created in 1998 to provide the professional construction community with a source of Building Code and architectural information that will enable them to be better-prepared for working with the governmental bodies that enforce regulations pertaining to the construction industry.*
Fire and Life Safety Summary (FLSS)

- A Fire and Life Safety Summary (FLSS) is required per OSSC [106.1.1] for buildings with complex fire and life safety systems when the life safety plans examiner determines it is necessary to clarify how the building will conform to building codes. Examples of buildings where Fire & Life Safety Summaries are required include, among others: hospitals, malls, large assembly buildings, high-rise buildings and buildings with smoke control systems.

- The purpose of the FLSS is to provide a clear and understandable explanation of the fire and life safety systems in a building, using floor plans, diagrams and simple non-technical language. It is a useful coordination tool and reference for architects, engineers and consultants during the design process. It is vital to the review of separate Mechanical Permit and Fire Sprinkler and Alarm Permits. The FLSS is used by the general contractor, subcontractors, architects, third-party Inspectors, and building and fire Inspectors during construction, testing and commissioning. It is also a valuable reference for those involved in the ongoing maintenance and future alterations of the building, including the building owner, facilities manager, fire inspector, and future architects, contractors, plan reviewers and building inspectors.

- The FLSS is to be produced in 8-1/2 x 11 booklet format (e.g., 3-ring binder, etc.). One copy is required with the initial Building Permit submittal package and seven copies are required after the review is complete and the Building Permit is ready to issue. A revision to the construction drawings that is submitted after the Building Permit Issued must include the corresponding revision for the FLSS if the revision significantly changes the intent of the FLSS.

Outlined below are the four elements of the FLSS.

1. Narrative
   - This Document
   - Appeals Summary
   - Fire Protection Outlines, DSC & Engineering

Pages 1-3
Pages 4-7
Page 8-9

A. Team Directory

- Portland State University,
  Tom Arnich, Consulting Architect
  PSU Facilities & Planning
  PO Box 751
  Portland, OR 97207
  503-725-4306

- Consultant
  MJ Arts
  Marty Jones, Code Consultant
  7322 SE 112th Ave
  Portland, Oregon 97266
  503-760-3272
  www.mjarts.com
  marty@mjarts.com
B. Building Summary
- Site Location: 1900 SW 4th Avenue
- Uses: Offices, Classrooms, Assembly Spaces, Retail, Parking Garages
- Occupancy classifications: B, M, A3
- Number of stories: 7 stories
- Structural system: Reinforced Concrete/PT Slabs/SteelColumns
- Type of construction: Type IB A/S; Type IIB A/S
- Number of dwelling units: 0

C. Hourly Fire-Resistive Construction Requirements

<table>
<thead>
<tr>
<th>Building Element</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural frame</td>
<td>2 b</td>
</tr>
<tr>
<td>Exterior Bearing walls</td>
<td>2</td>
</tr>
<tr>
<td>Interior Bearing walls</td>
<td>2 b</td>
</tr>
<tr>
<td>Interior Nonbearing walls and partitions f</td>
<td>0</td>
</tr>
<tr>
<td>Floor construction, Including supporting beams and joists</td>
<td>2</td>
</tr>
<tr>
<td>Roof construction, Including supporting beams and joists</td>
<td>1 c, d</td>
</tr>
</tbody>
</table>

b. Roof supports: Fire-resistance ratings of structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only. **Does Not Apply**
c. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members. **Does Not Apply**
d. In all occupancies heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required. **Does Not Apply**

D. Hourly Fire-Resistive Separation Requirements
- Corridors: **Non-rated, by Appeal** [see attached]
- Occupancy Separations (or indicate Non-Separated Uses): **Non-Separated Uses**
- Stair Enclosures: **Two-Hour**
- Shafts: **Two-Hour; excluding automobile ramp**- by Appeal [see attached]
- Elevator Lobbies: **Non-rated, by Appeal** [see attached]
- Horizontal Exits: **Three-Hour, between Computer Sciences and Development Services Building**

E. Exit Systems
- Travel Distance: **300ft maximum; to Exits or Exit Stair Enclosures**
- Common Path of Egress Travel: **100ft maximum**
- Occupant Loads: **Varies**
- Number of Exits Provided: **Nine provided from Lower Level**
- Corridors: **Non-rated, by Appeal** [see attached]
- Exit door locks, latches and electric locks: **Various locations, by Appeal** [see...
attached

- Automatic-closing doors and doors with hold-open devices: **Various locations**
- Horizontal Exits: **Three-Hour, between Computer Sciences and Development Services Building**
- Smokeproof Enclosures: **No; by Appeal [see attached]**
- Stair Enclosures: **Non-rated, by Appeal [see attached]**
- Exit Passageways: **No**
- Exit Discharge to Public Way: **Yes**
- Exterior balconies: **Yes**
- Exterior Stairs: **Yes**
- Exit Courts: **No**
- Illuminated Exit Signs: **Yes**
- Egress Lighting on Emergency Power: **Yes**
- System testing methods and testing criteria: **Smoke Evacuation System**

**F. Emergency Power and Standby Power Systems**
- **Not Included**

**G. Mechanical (HVAC) Systems**
- **Not Included**

**H. Fire Command Center**
- **Yes, but not included**

**I. Automatic Sprinkler System**
- Locations and types of sprinklers: **Quick-Response heads at various locations; see attached Appeals**
- Secondary water supply location and sizing: **No; by Appeal [see attached]**
- Fire pump location and sizing: **Not Included**
- Fire department connection locations: **Not Included**
- Standpipe types and locations: **Not Included**
- Sprinkler systems testing methods and testing criteria: **Not Included**

**J. Fire Alarm System**
- **Not Included**

**K.** For existing buildings entering into a Phased Life Safety Improvement Agreement between the building owner and the city:
- **Not Applicable**

**L.** A separate Occupancy Safety During Construction Plan may be required for alterations to existing buildings that will remain occupied during construction.
2. Plans

Site Plan and Floor Plans of each unique floor that are legible, black and white, drawn to a recognizable scale, and contain the information listed below. 11x17 inch foldout sheets bound into the booklet are preferred. Larger plans may be folded and inserted into a pocket of the booklet for buildings with footprints too large to be legible on 11X17 inch sheets:

The following plans are attached, in 18X24 format:

Overview
Plaza Level
Lower Level
Basement P1
Basement P2
Development Services Building
Engineering Building

3. Emergency Systems Initiation Devices and Responses
Fire Protection Outlines Included

4. Appeals
1900 Building Appeal History

3/28/1963  Two-hour fire protection of floor deck and three hour protection of beams and girders using Armstrong Acoustical Fireguard ceiling assembly; Appeal approves the omission of fire dampers at duct penetrations, per manufacturer's tests.

9/12/1974  Permits solid-core wood doors with wire glass in [wood?] frames; doors to have closers and magnetic hold-opens where doors will remain open. [Location within building is unclear] 3 stories, F2, Type IA/S

5/30/1974  Permits unrated openings in auto ramp [shaft] that penetrates the building, provided that sprinkler heads are added. Denied monumental stair without handrails. Permits unprotected opening between floors at plaza; two MOE from dining area instead of three [food service that serviced the dining area is gone; it appears to have been replaced with study area]; Two-hour opening into Stairway #4 from concrete airway. 1 story, F, Type IA/S

10/6/1982  Two-hour construction at Fan Rooms on P1 Parking Level in lieu of Fire Dampers at Lower Level floor deck; to protect computer plenums on Lower Level. Approved. 2 stories, B1/B2, Type I

12/18/1985  Unrated Corridor ceiling construction at north building [floor not specified] protected by sprinklers and ionization; and unrated floor-ceiling assemblies, protected by sprinklers and ionization. Unrated ceiling approved as proposed. Fire protection of Structural Frame approved provided an Area Separation Wall is maintained between the original building and subsequent additions. [Appeal narrative comments that the structural beams and floor assembly were unprotected when the structure was built in 1963. Either the construction specified in the 1963 Appeal narrative was not used; or the Appellant was unaware of the rating on the ceiling system] 3 stories, B2, Type IIFR

8/6/1987  Permits one MOE from Lab 55-02. 3 stories, B2, Type II-N/I IA/S

8/26/1992  Permits water curtain at Corridor glazing and pressurized elevator shaft in lieu of smoke vestibule doors. [Location within building is unclear] 2 stories, B2, Type II-N IA/S

8/14/1996  August '96 Appeal refers to the two previous Appeals; and permits unrated Corridor ceiling construction, using overlapping 6#/cf foil-faced Thermafibre mineral wool batts in lieu of rated suspended ceiling materials. Light fixtures are to have sealed ballasts, and shall be low-energy type, not requiring ventilation.

July Appeal addresses unrated Corridors "at lower level of building" [location within building is unclear. Appeal narrative refers to attached letter and diagrams that have not been included with the Appeal results]. Appeal approves [presumed] unrated elevator lobbies; [presumed] unrated relites at Corridors using additional sprinkler heads at the relites [no window coverings permitted]; and combination smoke/fire dampers at duct penetrations. The Corridor in question is not to be used as an expansion of the future office tower [presumably the Development Services Building]. This Appeal also approves an extension of the Lower Level Exit Enclosure. 2+ stories, B2, Type II-N

10/16/1996  Permits Dead End Corridor adjacent to Suite 70 to 22ft; Denies the use of pressurization of the Corridor in lieu of smoke dampers. 2+ stories, B2, Type II-N

1/28/1998  Development Services Building: Denial of Appeal to have building classified as other than a high-rise. Acceptable with high-rise package less the secondary water supply. 7 stories, B2, Type IA/S

2/11/1998  Development Services Building: Waives secondary water supply and reduces fire pump requirements. Permits pressurized elevator hoistways in lieu of elevator lobbies. Denies waiver of pressurized stairwell vestibule and rolling fire door at west stairwell. 7 stories, B2, Type IA/S


system, in lieu of stairwell enclosure. Permits rated “Total Door” system at main level enclosure. 7 stories, B2, Type I A/S

10/14/1998 Development Services Building: Permits revised Exit distribution system/separation of Exits. 7 stories, B2, Type I A/S

11/4/1998 Development Services Building: Permits fan coil units suspended in the ceiling plenums of the building, serving the floor above; without shaft protection. Smoke/Fire Damper are located at floor penetrations, connected to the building’s sprinkler and ionization systems. Appeal approved on the following basis:
- Smoke/Fire Damper at all floor openings that will close upon activation of the automatic sprinkler water flow and the building’s smoke detection system, within 5ft of any Smoke/Fire Damper.
- Incident floor exhaust accomplished by the system going to 100% supply and 0% exhaust on this floor; and
- Non-incident floor pressurization accomplished by the system going to 100% supply and 0% exhaust on the floors located above and below the incident floor.
7 stories, B2, Type I A/S

11/12/1998 Development Services Building: Permits extended Dead End Corridors on the 2nd Floor; unrated, non-combustible Corridors on the 3rd Floor; 20-minute doors with unrated relics in Corridors on the Plaza and 2nd Floor levels; denied lack of man-door near Permit Center entry. 7 stories, B2, Type I A/S

1/6/1999 Development Services Building: Permits oversized, unrated glass doors and relics, protected by water curtains, at Copy Center [140-0], Retail [150-0], Cashier [120-5], and 2nd Floor Document Center [220-4]. 7 stories, B2, Type I A/S

1/13/1999 Development Services Building: Permits non-Accessible 6th toilet stall in Women's toilet room on 2nd Floor. 7 stories, B2, Type I A/S


1/10/2001 Appeal Denied. Single MOE from classrooms at Suite 90. 4 stories, B, Type I A/S

3/10/2004 Engineering Building: Smoke control system and exiting systems-
The Administrative Staff reviewed the appeal and the following decision was reached:
1. Atria design: Granted in concept, subject to final approval of smoke control design of atrium by the Fire Marshal’s Office and BDS Plan Review staff.
2. Stairway opening from 1st floor to basement at atrium: Denied as proposed. Proposal does not provide discussion of prevention of smoke migration to basement or smoke removal from basement.
3. Garage ventilation system: Granted as proposed.
5. Common exhaust for lab spaces: Granted in concept. Final plan of how enforcement of use of incompatible materials will be controlled is to be submitted to Fire Marshal’s Office and BDS Plan Review staff for final approval prior to issuance of permits.
6. Suite concept for labs: Granted as proposed, as outlined in plans submitted.
5 stories, B, Type I A/S

5/5/2004 Appeal Denied. Exiting configuration: Single MOE from classrooms. Proposal does not provide equivalent egress capability. 2 stories, B, Type IFR A/S

5/19/2004 Appeal Denied. Single MOE from classrooms at Suite 25. 2 stories, B, Type IFR A/S
APPEALS
DEVELOPMENT SERVICES BUILDING
Alternate Protection: Size of water main; Smoke Control System; Sprinklers, Ionization

APPEALS
ENGINEERING BUILDING
Benches in Corridors;
Common Exhaust at Laboratory Spaces
Alternate Protection: Smoke Control System;
Sprinklers, Ionization

APPEALS
COMPUTER SCIENCES
[12/18/1985] Unrated Corridors [Location Unclear]
Alternate Protection: Mineral Wool Batts @ ceilings;
Sprinklers, Ionization;
4-Hr Area Separation Wall

PLAZA LEVEL
Legend
Exit
Shaft (typ. Elevator)
Atrium
Primary Means of Egress

4th Avenue Building
[FAB]
1900 SW 4th
Scale: 1" = 30ft
APEALS
PARKING P1
[10/6/1982] 2-HR Construction at Fan Rooms in Lieu of
Smoke/Fire Dampers at Ceiling for Computer Plenum
[3/10/2004] Reduced Ventilation at Parking Garage
Alternate Protection: Smoke Control System; Sprinklers,
Mechanical Ventilation System

Sprinklers: Dry-System

4-HR Air Separation Wall
APPEALS
PARKING P2
[10/6/1982] 2-HR Construction at Fan Rooms in Lieu of Smoke/Fire Dampers at Ceiling for Computer Plenum
[3/10/2004] Reduced Ventilation at Parking Garage
Alternate Protection: Smoke Control System; Sprinklers, Mechanical Ventilation System
Appeal Items
1. Less than 30 foot clear opening in floors of main atrium space (Floors 1-5), which is between 5 and 7 stories in height.
   (Concept granted by City, 3/10/04)
2. Opening less than 30 foot clear between lower level and ground floor atrium area. (Revised 4/15/04)
3. Continued use of existing mechanical exhaust system in the existing garage spaces. (Granted by City - 3/10/04)
4. Use of furnishings in corridors.
   (Concept granted by City, provided compliance with BDS Code Guide USC/1059, maintained - 3/10/04)
5. Exhaust multiple hazardous lab spaces through a common exhaust system. (Concept granted by City, 3/10/04)
6. Utilizing "lab unit" concept to group multiple lab spaces together eliminating the need for occupancy separations between labs. (Granted by City - 3/10/04)
7. Sprinkler protection of glazed openings in corridor walls.
   Additional discussion regarding other types of opening protection (fixed fire rated, sprinklered atrium openings protected by Central WS sprinklers in stairs). (4/15/04)

Atrium Smoke Control System Description
1. The smoke control system is being designed per OSGC Section R05 and City of Portland requirements. Three smoke exhaust fans will be located on the roof of the atrium. Smoke will be drawn through the atrium ceiling and discharged to the roof through upblast, propeller ventilators constructed for high temperature smoke control. Outside air will be drawn into Level 1 of the atrium and through doors which will be powered open automatically upon initiation of the smoke control system.
2. The inlet velocity will be less than 200 FPM. The minimum required volume of ambient air is 8-10 air changes per hour. The system is designed for 60,000 CFM, which is 11 air changes per hour.
3. All equipment and controls will be supplied with two sources of power, with primary power from the normal building power system and secondary power from an emergency generator located in the building.
4. The smoke control system will be automatically activated by the Fire Alarm System upon detection of water flow in the sprinkler system or smoke within the atrium volume. In addition, manual control capability will be provided by a Firefighter's Control Panel located on Level 1 within the atrium.

See ENGINEERING BUILDING FIRE PROTECTION OUTLINE

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**ENgINEERING BUILDING**

4th Avenue Building  
[FAB]  
1900 SW 4th  
Scale: 1"=40ft  
ara illustration  
303-776-4577  
ara@ara.com  
ara.com