

Development Services

From Concept to Construction

Phone: 503-823-7300 Email: bds@portlandoregon.gov 1900 SW 4th Ave, Portland, OR 97201

More Contact Info (<http://www.portlandoregon.gov/bds/article/519984>)



APPEAL SUMMARY

Status: Hold for Additional Staff Review

Appeal ID: 20810	Project Address: 5060 N Greeley Ave
Hearing Date: 8/28/19	Appellant Name: Dannon Canterbury
Case No.: B-018	Appellant Phone: 503.928.6965
Appeal Type: Building	Plans Examiner/Inspector: Brian McCall
Project Type: commercial	Stories: 5 Occupancy: S-2, A-2, A-3, B Construction Type: III-A, I-A
Building/Business Name: adidas North Building	Fire Sprinklers: Yes - Throughout
Appeal Involves: Erection of a new structure	LUR or Permit Application No.: 18-188494-CO
Plan Submitted Option: pdf [File 1] [File 2] [File 3] [File 4] [File 5]	Proposed use: Office, Assembly, Parking

APPEAL INFORMATION SHEET

Appeal item 1

Code Section	2014 OSSC 711.7, 713.4, 713.11, 713.12, 717.3.2.1, 717.3.2.2, 717.3.2.3
Requires	<p>Openings in horizontal fire barriers and fire separation assemblies, such as floor/ceiling assemblies, require protection by one of two methods: either the installation of approved opening protectives including fire doors and fire dampers, or the construction of vertical shafts having a fire resistance rating equal to or greater than the fire resistance rating of the horizontal assembly. Fire resistance-rated vertical shafts are typically used to protect openings in horizontal assemblies between floors that enclose mechanical, electrical, and plumbing services.</p> <p>In buildings of protected combustible construction (Types IIIA and VA, specifically), interior load bearing structural elements have fire resistance ratings not less than 1-hour when tested in accordance with ASTM E119.</p> <p>The building code has typically associated fire resistance ratings with the vertical or horizontal area exposed. As such, vertical shafts connecting three or fewer floors only require a 1-hour fire resistance rating. Nevertheless, OSSC Chapter 5 allows buildings with 1-hour fire resistance rated loadbearing construction to exceed this height. Consequently, the height of vertical shafts must either be limited or the fire resistance rating of structural elements supporting the shaft enclosure must be increased to 2 hours.</p> <p>One way to limit vertical shafts to three stories or less is to separate the shaft into separate compartments, each less than three stories in height. This can be achieved by installing combination fire and smoke rated dampers every third floor inside the shaft. Combination fire and smoke dampers suitable for this application must satisfy the requirements of OSSC §717.3.1, which requires testing of these devices in accordance with UL 555 and UL 555S.</p>

Proposed Design Per 2014 OSSC Section 713.4, shaft enclosures must have a minimum fire rating of 2 hours where connecting 4 or more stories. The proposed design is to provide two stacked 1-hour rated shaft enclosures each connecting 3 stories or less and separated from each other by a 1.5-hour rated combination fire/smoke damper per Sections 717.3.2.1, 717.3.2.2, and 717.3.2.3. Equivalent protection is provided by limiting the exposure of fire, smoke, heat, and hot gasses to not more than 3 stories as required by code. Any other story will not be exposed to fire or products of fire due the fire/smoke damper that is allowed to protect any opening in a shaft. Section 713.11 allows fire dampers to enclose the bottom of a shaft. Section 713.12 allows a shaft to be enclosed at the top with the same rating of the topmost floor penetrated but not less than the rating of the shaft. The proposed design includes 1-hour rated floors and a 1-hour rated shaft enclosure. The 1.5-hour fire/smoke damper exceeds the rating requirements for the top of the shaft.

Reason for alternative In general, it is uncommon and costly to provide vertical loadbearing structures with more than 1-hour fire resistance in this type of construction. As such, vertical support for shaft assemblies requiring a 2-hour fire resistance rating can prove difficult if not impractical to achieve.

The proposed installation of a fire and smoke rated damper tested in accordance with UL 555 and UL 555S complies with the prescriptive requirements of OSSC 711.7. This approach ensures that the vertical shaft is separated by a 1-hr fire resistance rated construction such that it connects no more than three floors.

Section 713.12 allows a shaft to be enclosed at the top with the same rating of the topmost floor penetrated but not less than the rating of the shaft. The proposed design includes 1-hour rated floors and a 1-hour rated shaft enclosure. The 1.5-hour fire/smoke damper exceeds the rating requirements for the top of the shaft.

The UL 555 test is performed using the same test furnace and fire growth curve used in other fire resistance tests, including UL 263 and UL 10B. This curve is based on the ASTM E119 standard time-temperature exposure. As such, it provides protection equivalent to that required by OSSC §711.7.

APPEAL DECISION

Use of two stacked 1 hour shaft enclosures in lieu of 2 hour rated: Hold for additional staff review.

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One way to limit vertical shafts to three stories or less is to separate the shaft into separate compartments, each less than three stories in height. This can be achieved by installing combination fire and smoke rated dampers every third floor inside the shaft. Combination fire and smoke dampers suitable for this application must satisfy the requirements of OSSC §717.3.1, which requires testing of these devices in accordance with UL 555 and UL 555S.

Use of 2 stacked 1 hour rated mech. shafts separated by 1.5 hr fire smoke damper in a 5 story building.

See also, attached memo.

Prescriptive?

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The UL 555 test is performed using the same test furnace and fire growth curve used in other fire resistance tests, including UL 263 and UL 10B. This curve is based on the ASTM E119 standard time-temperature exposure. As such, it provides protection equivalent to that required by OSSC §711.7.

The administrative staff has not yet reviewed this appeal.

From: [McCall, Brian](#)
To: [BDS Appeals](#)
Subject: RE: B-18, ID 20810, 5060 N Greeley Ave
Date: Wednesday, August 28, 2019 4:45:52 PM

Current design has unprotected beams running through multiple shafts. Due to shafts running vertically more than 3 stories, it was noted during plan review that structure that supports two hour shafts is also required to be 2 hour rated.

Reviewed with architect that the beams could be calculated for char, wrapped with gyp, or a combination. Applicant returned with Code Unlimited memo stating that rated FSD's is a prescriptive code path to allow for vertically stacked shafts, then reviewed with senior plans examiners and determined that this strategy would require a building code appeal.

Reviewed with the applicant that the appeal should provide a detailed explanation demonstrating that UL 555 is equivalent to UL 263 or ASTM E 119, as the FSD needs to function to the same level as a tested and rated horizontal assembly (713.2 shafts shall be constructed as fire barriers or horizontal assemblies, or both – doesn't clearly say or section 717). I would also expect the appeal to clarify the mechanical functions in the shaft as an activated FSD might impact potentially required building mechanical systems during an emergency event.

Contrary to the appeal text, it is not uncommon and costly to build 2 hour shaft walls, since 2 hour shaft walls are highly prevalent in apartment building construction.

It seems that providing two hour rated beams in the shaft and 2 hour rated shaft walls would be a more appeal friendly strategy. This would allow for protection in hidden enclosed areas while beams that are visible in the adjacent office spaces may be unprotected since fire damage would be noticed by building occupants.

Thanks,

Brian McCall

Commercial Plans Examiner
City of Portland - **Bureau of Development Services**
Life Safety Plan Review Section, Plan Review and Permitting Services Division
Brian.mccall@portlandoregon.gov
(503) 823-7063 p

Work Hours: Monday-Friday, 7:30AM - 5:00PM
Out of Office alternating Friday

From: BDS Appeals <AppealsS@portlandoregon.gov>
Sent: Monday, August 26, 2019 10:40 AM
To: McCall, Brian <Brian.McCall@portlandoregon.gov>
Subject: B-18, ID 20810, 5060 N Greeley Ave



5060 N. Greeley Avenue
Portland, OR 97217

ARCHITECT
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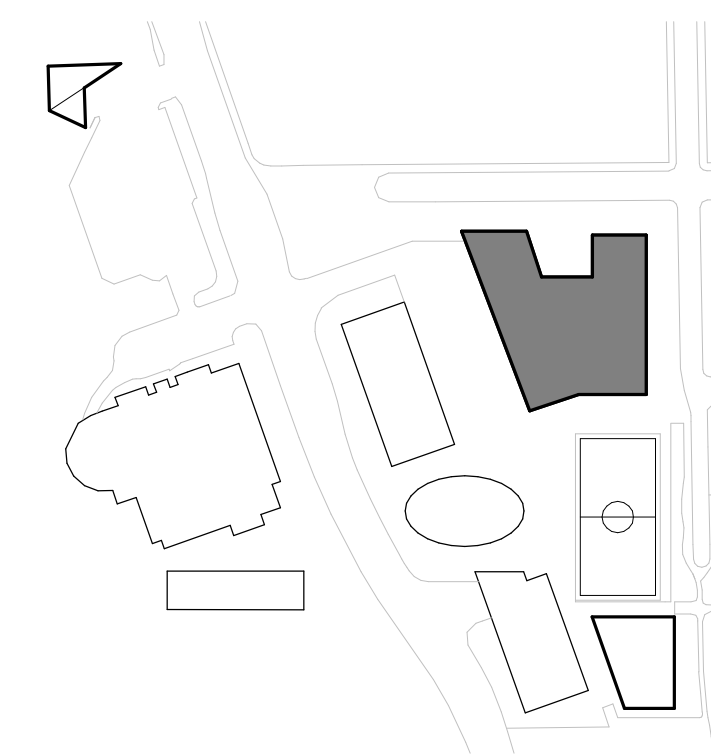
4713 N. Albina Avenue, 4th Floor
Portland, OR 97217
T: 503 928 6040
www.leverarchitecture.com

INTERIOR ARCHITECT

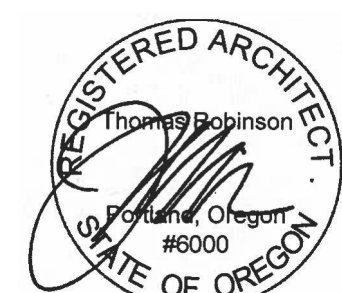
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San Francisco, CA 94103
T: 415 908 1880
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KEY PLAN



STAMP

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PHASE
NORTH BUILDING PERMIT

PROJECT NUMBER

187

SCALE

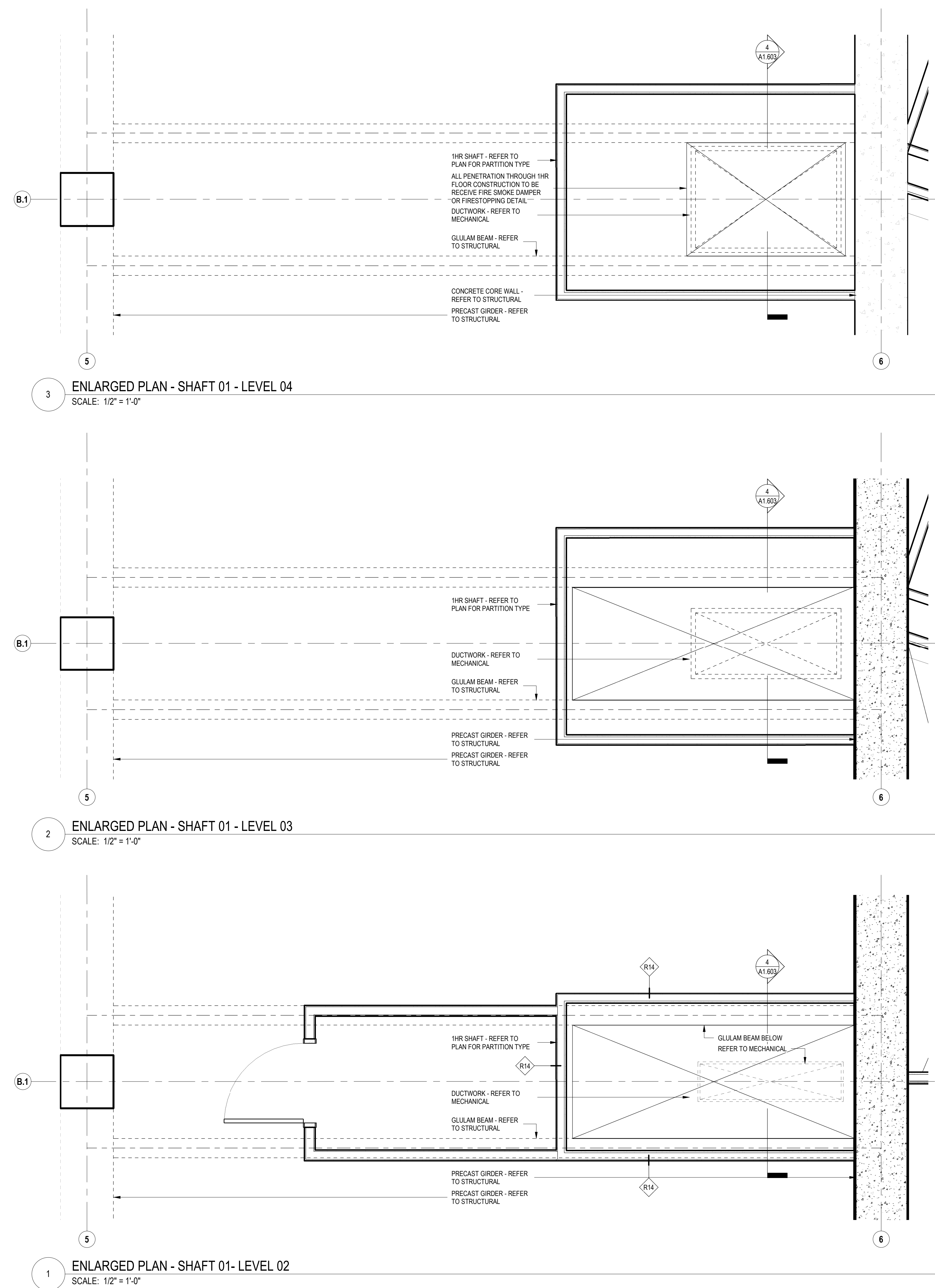
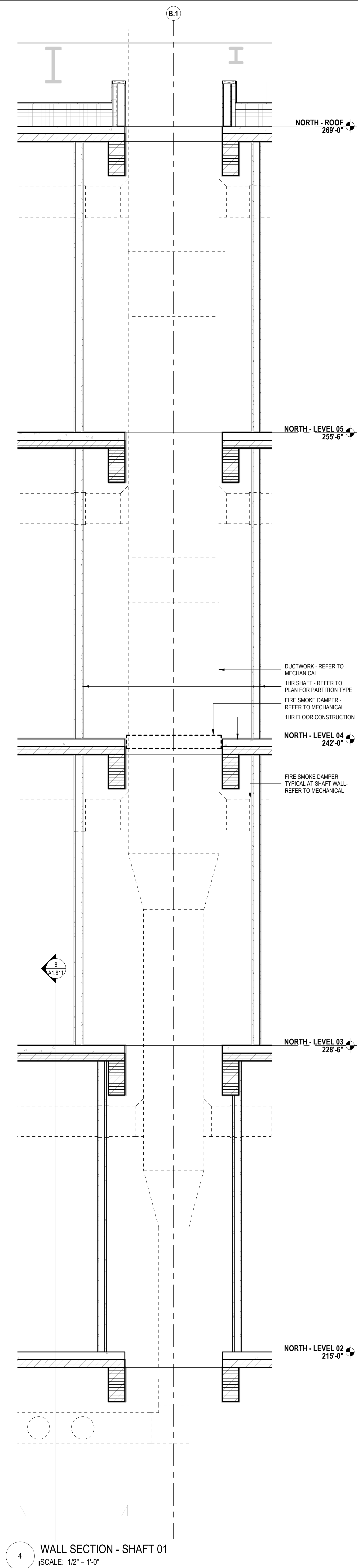
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SHEET TITLE

NORTH BUILDING - INTERIOR DETAILS -
SHAFT 01

A1.603

FULL SIZE PRINT = 35"x48"



07/31/2019 12:45:17 PM



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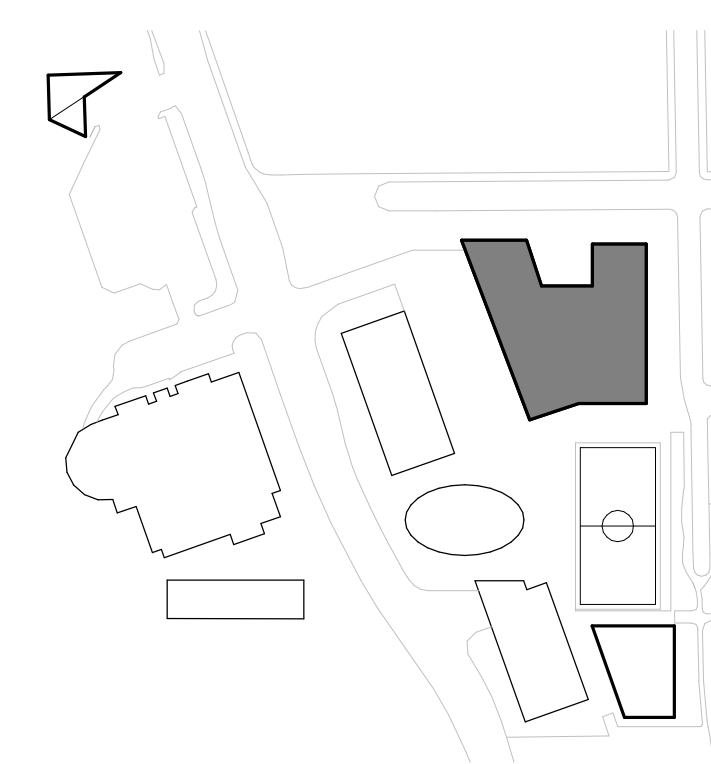
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KEY PLAN



STAMP



ISSUE

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PMAS

NORTH BUILDING PERMIT

PROJECT NUMBER

407

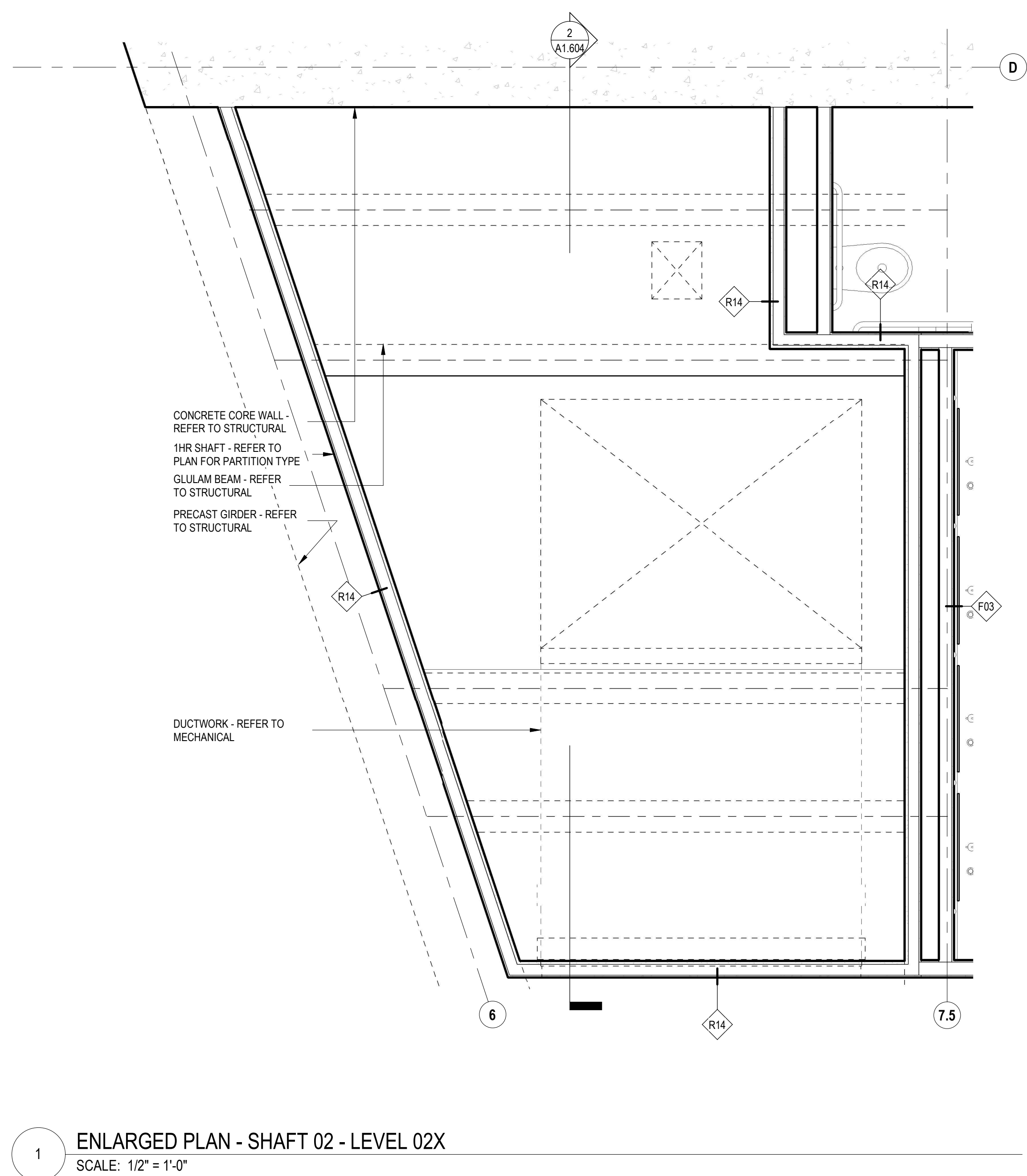
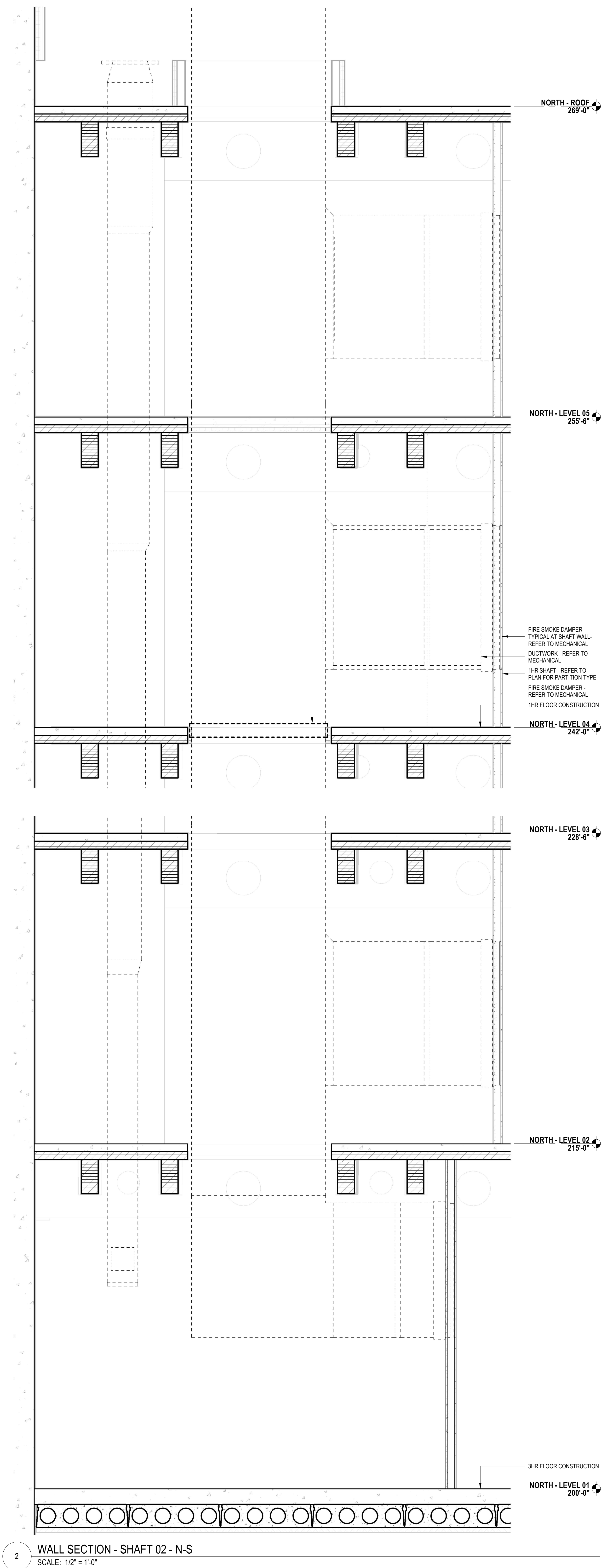
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$$1/2'' = 1'-0''$$

SHEET TITLE

NORTH BUILDING - INTERIOR DETAILS -
SHAFT 02

A1.604





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Portland, OR 97217

ARCHITECT
LEVER

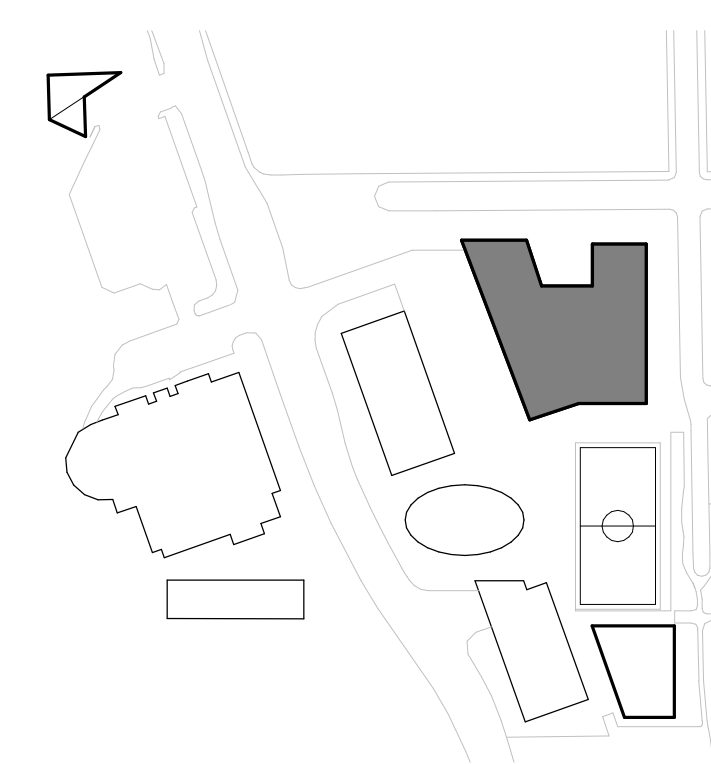
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452 Tehama Street
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KEY PLAN



STAMP



ISSUE

[illegible]

PHASE

NORTH BUILDING PERMIT

PROJECT NUMBER

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SCALE

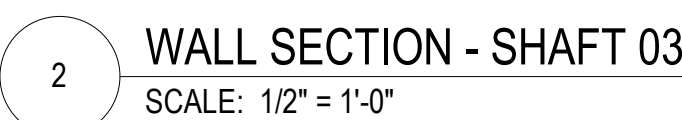
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SHEET TITLE

NORTH BUILDING - INTERIOR DETAILS -
SHAFT 03

A1.605

FULL SIZE PRINT = 35"x48"



07/31/2019 12:41:18 PM



Client Name:	Lever Architecture		
Project Number:	C00166-004A.2	Date:	8/16/2019
Distribution:	Chris Grosse		
Subject:	Combination Fire/Smoke Damper Separating Vertical Shafts		
Referenced Codes and Standards:	2014 Oregon Structural Specialty Code (OSSC), including Appendix N		
Building Name:	adidas – North Building		
Room Area Affected:	Vertical Shafts		

1 OVERVIEW

Lever Architecture is designing the new North Building located on the Adidas campus in Portland, Oregon. The proposed building is five levels above grade of Type III-A construction and five levels below grade of Type I-A construction. The building is occupied by occupancy groups A-2, A-3, B, and S-2. The building is protected by an automatic fire sprinkler and fire alarm systems throughout.

Code Consultants Unlimited has been asked to review the requirements of the OSSC applicable to the protection of vertical openings in fire resistance rated horizontal assemblies.

2 CODE ANALYSIS

Openings in horizontal fire barriers and fire separation assemblies, such as floor/ceiling assemblies, require protection by one of two methods: either the installation of approved opening protectives including fire doors and fire dampers, or the construction of vertical shafts having a fire resistance rating equal to or greater than the fire resistance rating of the horizontal assembly. Fire resistance-rated vertical shafts are typically used to protect openings in horizontal assemblies between floors that enclose mechanical, electrical, and plumbing services.

In buildings of protected combustible construction (Types IIIA and VA, specifically), interior load bearing structural elements have fire resistance ratings not less than 1-hour when tested in accordance with ASTM E119. In general, it is uncommon and costly to provide vertical loadbearing structures with more than 1-hour fire resistance in this type of construction. As such, vertical support for shaft assemblies requiring a 2-hour fire resistance rating can prove difficult if not impractical to achieve.

Lever Architecture – adidas – North Building

The building code has typically associated fire resistance ratings with the vertical or horizontal area exposed. As such, vertical shafts connecting three or fewer floors only require a 1-hour fire resistance rating. Nevertheless, OSSC Chapter 5 allows buildings with 1-hour fire resistance rated loadbearing construction to exceed this height. Consequently, the height of vertical shafts must either be limited or the fire resistance rating of structural elements supporting the shaft enclosure must be increased to 2 hours.

One way to limit vertical shafts to three stories or less is to separate the shaft into separate compartments, each less than three stories in height. This can be achieved by installing combination fire and smoke rated dampers every third floor inside the shaft. Combination fire and smoke dampers suitable for this application must satisfy the requirements of OSSC §717.3.1, which requires testing of these devices in accordance with UL 555 and UL 555S.

Combination fire and smoke dampers must have a fire resistance rating equal to or greater than the rating of the assembly penetrated and must limit leakage from the exposed to unexposed sides. Fire dampers typically have either 1½-hour or 3-hr fire resistance ratings. As such, openings in 1-hour fire resistance rated assemblies will typically have a damper with a 1½-hour fire resistance rating installed.

The UL 555 test is performed using the same test furnace and fire growth curve used in other fire resistance tests, including UL 263 and UL 10B. This curve is based on the ASTM E119 standard time-temperature exposure. As such, it provides protection equivalent to that required by OSSC §711.7.

3 PROPOSED DESIGN

The proposed arrangement of the required combination fire and smoke rated damper at the floor/ceiling assembly inside the vertical shaft is illustrated on Sheets A1.603, A1.604, A1.605, and A1.606 of the architect's permit set dated 7/31/2019 (see Figures 1 and 2 below for typical condition). These details illustrate prescriptive compliance with the provisions of OSSC §711.7 and §717.3.2.3,

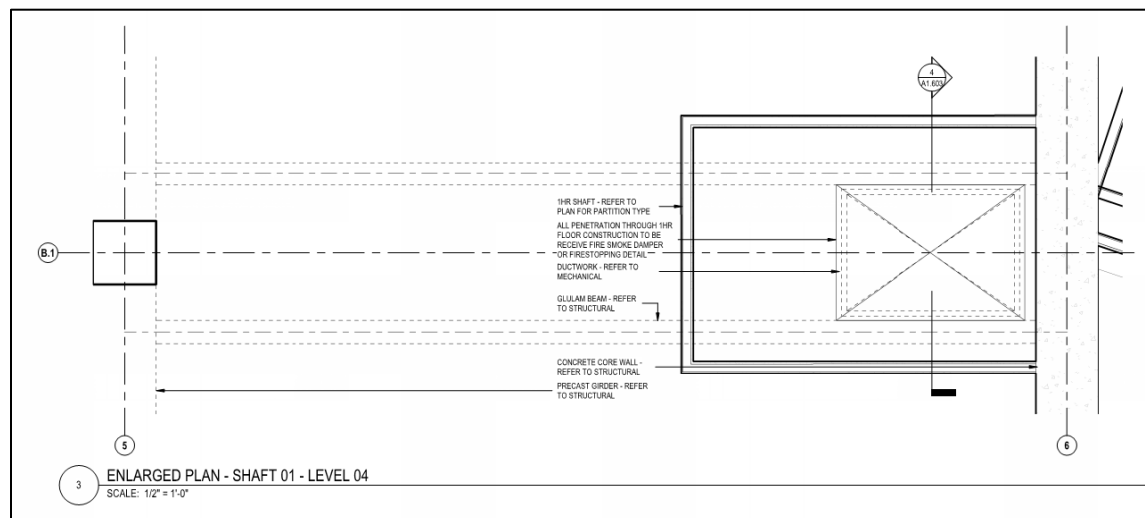


Figure 1: Plan view of vertical opening in shaft between Floors 3 and 4.

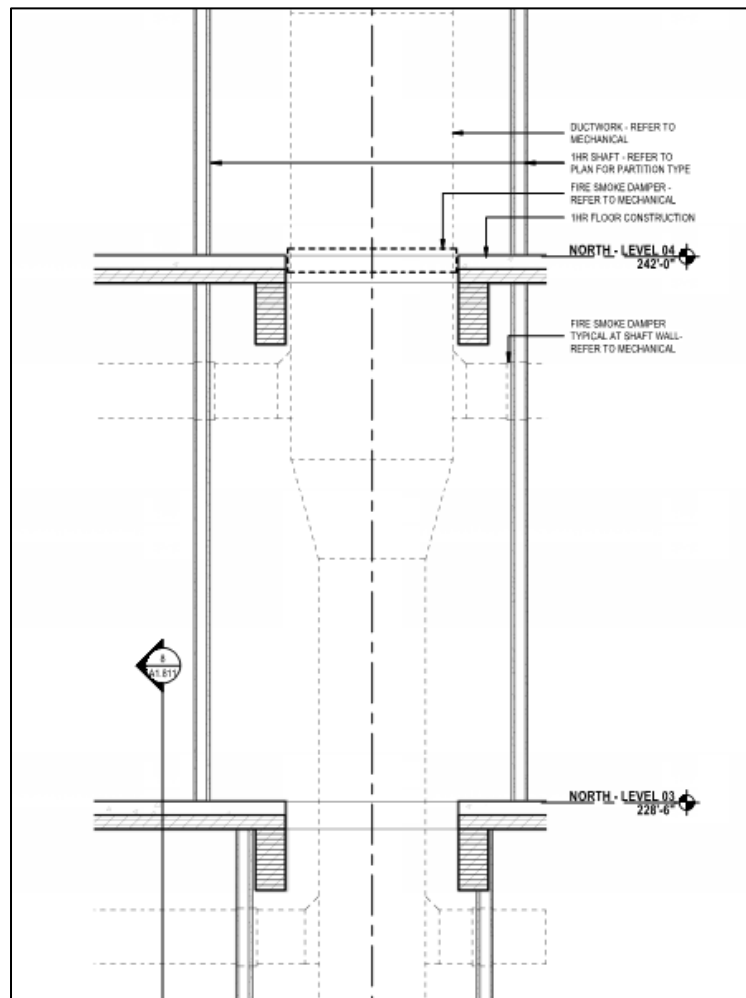


Figure 2: Vertical section through shaft at horizontal assembly between Floors 3 and 4.

4 CONCLUSION

This memo reviews the requirements of the OSSC applicable to the protection of vertical openings in fire resistance rated horizontal assemblies. This analysis concludes that the proposed installation of a fire and smoke rated damper tested in accordance with UL 555 and UL 555S complies with the prescriptive requirements of OSSC §711.7. This approach ensures that the vertical shaft is separated by 1-hr fire resistance rated construction such that it connects no more than three floors.