HALIFAX
REGIONAL MUNICIPALITY

P.O. Box 1749
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Design Review Committee
January 12, 2012

TO: Chair and Members of Design Review Committee

SUBMITTED BY: Phil Townsend, Director, Planning and Infrastructure

DATE: December 20, 2011

SUBJECT: **Case 17442, Substantive Site Plan Approval – Citadel Hotel Redevelopment, 1960 Brunswick Street**

ORIGIN

Application by SilverBirch No 15 Holdings Ltd.

RECOMMENDATION

It is recommended that the Design Review Committee:

1. Approve the qualitative elements of the substantive site plan approval application for the mixed-use redevelopment of the Citadel hotel site at 1960 Brunswick Street, as shown on Attachment A; and

2. Approve the requested streetwall height variance along Brunswick and Cogswell Streets as shown and described on Attachments A and B.

BACKGROUND

Project Description

This application for substantive site plan approval is for the mixed-use redevelopment of the Citadel hotel site at 1960 Brunswick Street, at its intersection with Cogswell Street (refer to Attachment A). The proposal is to demolish the existing hotel and replace it with two new buildings, one of which is proposed to be a two-tower hotel complex with commercial uses at the base and the other, a multi-unit residential building with ground floor commercial space and attached parking structure. The following highlights the major elements of the proposal:

- a two-tower hotel complex with an L-shaped, common base housing commercial floor space and hotel lobby, amenity, restaurant and meeting/conference facilities;
- hotel tower heights of 13 storeys, one containing 159 rooms and the other with 119 rooms;
- 17-storey building containing ground-floor commercial units and approximately 153 residential units on 15 levels;
- shared parking structure attached to the rear of the residential building and containing approximately 230 parking spaces;
- shared driveway access between the two buildings off Brunswick Street and service entrance at southern end of site off Brunswick Street;
- subdivision of land to allow each building to be on its own lot;
- landscaped and extensive "green-roof" areas on the hotel's second and 11th floor terraces, on the hotel rooftops, on the residential building's 3rd and 11th floor terraces and on the rooftop of the parking structure; and
- exterior cladding materials which include brick of varying colours, architectural stone, glass curtain wall with aluminum frames, metal or pre-cast panels, canvas and glass canopies and metal railings.

Information about the approach to the design of the building has been provided by the project's architect (Attachment B).

Regulatory Context

The Site and the Land Use By-law

The following are relevant to note from a regulatory context:

- the site is within the DH-1 Zone
- the site is within the Cogswell Area (#8) Precinct;
- the maximum pre-bonus height is 49 metres and the maximum post-bonus height is to the maximum height allowed by the Rampart regulations; and
- the northwest corner of the site, off Cogswell Street, is encumbered by Viewplane #1.

The proposed building heights are below the 49m pre-bonus height limit as well as the Citadel ramparts height limit. With regard to the viewplane, a small, low-rise portion of the building lies beneath but does not penetrate the viewplane.

Substantive Site Plan Approval
In accordance with the Substantive Site Plan Approval process, as set out in the Downtown Halifax Land Use By-law, the Development Officer is responsible for determining if a proposal meets the land use and built form requirements of the Land Use By-law. The Development Officer has reviewed the application and determined it to be in conformance with these requirements, with the exception of the minimum streetwall height, to which a variance has been requested via the DRC.

The role of the Design Review Committee in this case is to determine if the proposal should be approved with respect to the:

- design guidelines in the Design Manual;
- criteria in the Design Manual for the issuance of variances to the built form requirements; and
- suitability of expected wind conditions on pedestrian comfort.

DISCUSSION

Design Manual Guidelines

An evaluation of the proposed project against the applicable individual guidelines of the Design Manual is found in a table format (Attachment D). The table indicates if the project complies with a particular guideline. In addition, it identifies circumstances where there are different possible interpretations of how the project relates to a guideline or where additional explanation is warranted. These matters are outlined in more detail as follows.

Canopies and Awnings [2.8 d), 3.2.3 b)]
The Design Manual encourages canopies and awnings over the sidewalks abutting the project, as a means of providing weather protection for pedestrians. For the hotel, projecting canopies are proposed at the building corner (at the street intersection) above retail, and at hotel entrances off Brunswick Street and entrances internal to the site. Additionally, awnings are proposed above retail entrances near the corner. The residential building will have glass/steel projecting canopies above retail and residential entrances. As canopies and awnings are encouraged but not mandatory, except on pedestrian-oriented streets, the presence of these elements meets the intent of the manual.

Streetwall Height [3.1.3, 3.2.5 g)] (refer to Variance section below)

Streetwall Setback [3.1.2 a)]
The required streetwall setback is "Minimal to no setback" (0-1.5m). This setback does not apply to building corners or for minor recesses such as those at building entrances. Due to the large curve radius at the intersection, the hotel was horizontally stepped at the corner, resulting in slightly larger setbacks and a small plaza area at the retail entrances. Hotel entrances/ exits also employ slightly greater setbacks at the southernmost point along Brunswick Street and the northwest corner along Cogswell. As such, the proposal complies with this guideline.

Utilities along Street Frontages [3.2.1g and 3.5.1f]
The Design Manual states that mechanical or utility functions (vents, trash vestibules, propane vestibules) are not to be located along pedestrian frontages at grade level. At the northwest corner of the hotel along Cogswell Street, a pad mount transformer is proposed to be hidden via an extension of the brick wall instead of being completely enclosed by and internal to the building. This can be considered an appropriate design solution.

Lighting [3.5.4, 3.5.2 k)]
Proposed lighting of the buildings is shown on the elevation drawings included in Attachment A. The project architects have confirmed that the guidelines will be met. Proposed lighting includes wall sconce (surface mounted) lighting, recessed down and up lighting from the canopies and overhangs, and up lighting from planting bed(s). The observations in Attachment C are based on information provided by the architects and are for the committee's consideration.

Signage [3.5.5]
Hotel branding signage is shown on the plans and is intended to be approved by the Development Officer as part of this site plan approval process. The observations in Attachment C are based upon what has been portrayed on the building plans. Subsequent signage applications will be considered by the Development Officer.

Parking [3.5.2 c), f), g), j)]
The guidelines related to parking structures are intended for both stand-alone parking facilities and those combined with commercial or mixed-use developments. In this proposal, parking access and service areas are, in some cases, on the sides of buildings as opposed to in the rear. However, these areas are well set back and not highly visible from the sidewalk. The parking structure is to the rear of the site, is partly below grade and will not be highly visible from surrounding streets. Therefore, due to its location, size and intended usage, the parking structure's design is acceptable and meets the intent of the guidelines.

Parapet Design [3.3.4 f)]
The proposed parapets on the hotel's second floor roof terraces are intended to provide visual interest and create the appearance of a streetwall to offset the minimum streetwall height requirement (see Variance section below). While the parapets are not wrapped around or carried over to the side in all cases, their design can be considered acceptable.

Variances

There is one variance being sought to the quantitative elements of the Land Use By-law, relative to the minimum streetwall height. Information about the variances from the architect's perspective is found in Attachment B.

Minimum Streetwall Height Variance [3.6.3 a) through d)]
The Land Use By-law states that streetwalls are to have a minimum height of 11 metres and along the Brunswick and Cogswell Street frontages, they may have a maximum height of 18.5 metres. Along Brunswick Street, the streetwall will be, at most, 1.6 metres (maximum variance) below the minimum required height, and along the Cogswell Street frontage, the maximum variance will be 3.3 metres below the required height.

It is recommended that the streetwall height variance be approved on the basis that this allowance meets the conditions of 3.6.3 a), b) and c). Section 3.2.5g calls for flexibility in streetwall heights in sloping conditions. The existing streetwall height and setbacks along both Brunswick and Cogswell Streets are not consistent and varied, as illustrated by the large setbacks of the police station from Cogswell Street and the 10-storey apartment towers from the east side of Brunswick Street. Permitting the variance in this case is reasonable.

Wind Assessment

A wind assessment was prepared by RWDI Consulting Engineers and Scientists for the proposal (refer to Attachment D). The concern with respect to wind conditions is whether the site, and in particular the surrounding sidewalks, will be comfortable for their intended usage. Wind conditions are rated in terms of relative comfort for different pedestrian activities that include "sitting", "standing", and "walking." In general terms, the intended usage of the sidewalks is for "walking."

The RWDI Study concluded that there would be minimal changes to the wind conditions as a result of the proposal and that the proposed conditions would be generally suitable for intended usage in both summer and winter. It is also worth noting that there were no "failures" related to safety criterion nor any "uncomfortable" conditions in either the existing or proposed configurations.

Conclusion

Upon review of the proposal against the criteria of the Design Manual, staff recommend that the proposal meets the design guidelines and that the requested variance is appropriate.

BUDGET IMPLICATIONS

The HRM costs associated with processing this planning application can be accommodated within the approved 2011/2012 operating budget for C310, Planning and Applications. HRM is not responsible for renovation costs.

FINANCIAL MANAGEMENT POLICIES / BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Project and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Project and Operating reserves, as well as any relevant legislation.

COMMUNITY ENGAGEMENT

The community engagement process is consistent with the intent of the HRM Community Engagement Strategy and the requirements of the Downtown Halifax LUB regarding substantive site plan approvals. The level of engagement was information sharing, achieved through the HRM website, the developer's website, public kiosks at HRM Customer Service Centres, and a public open house.

ALTERNATIVES

1. The Design Review Committee may choose to approve the application for substantive Site Plan Approval, as submitted. This is the recommended course of action.

2. The Design Review Committee may choose to approve the application with conditions. This may necessitate further submissions by the applicant, as well as a supplementary report from staff.

3. The Design Review Committee may choose to deny the application. The Committee must provide reasons for this refusal, based on the specific guidelines of the Design Manual.

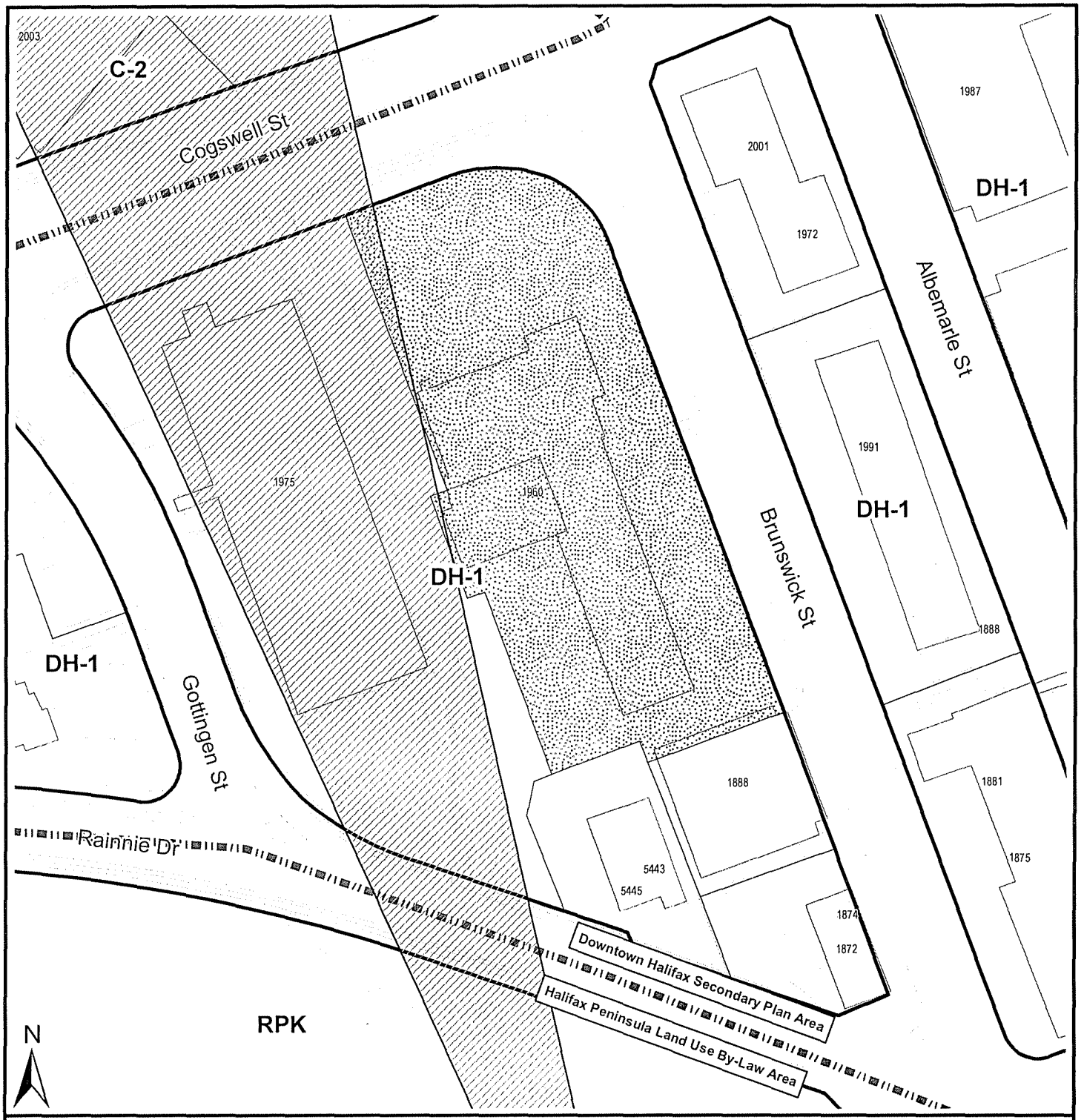
ATTACHMENTS

Map 1	Location and Zoning
Attachment A	Site Plan Approval Plans
Attachment B	Design Rationale
Attachment C	Renderings
Attachment D	Design Manual Checklist
Attachment E	Wind Study Final Report

A copy of this report can be obtained online at http://www.halifax.ca/boardscom/DesignReviewCommittee-HRM.html then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210 or fax 490-4208.

Report Prepared by: Paul Sampson, Planner, 490-6259

Report Approved by: Austin French, Manager, Planning Services, 490-6717



Map 1 - Location and Zoning

1960 Brunswick Street
Halifax

Subject property

View Plane 1

Downtown Halifax Secondary Plan Area
Halifax Peninsula Land Use By-Law Area

Zone - Downtown Halifax

DH-1 Downtown Halifax 1

HALIFAX
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COMMUNITY DEVELOPMENT
PLANNING SERVICES

0 20 40 m

This map is an unofficial reproduction of a portion of the Zoning Map for the plan area indicated.

HRM does not guarantee the accuracy of any representation on this plan.

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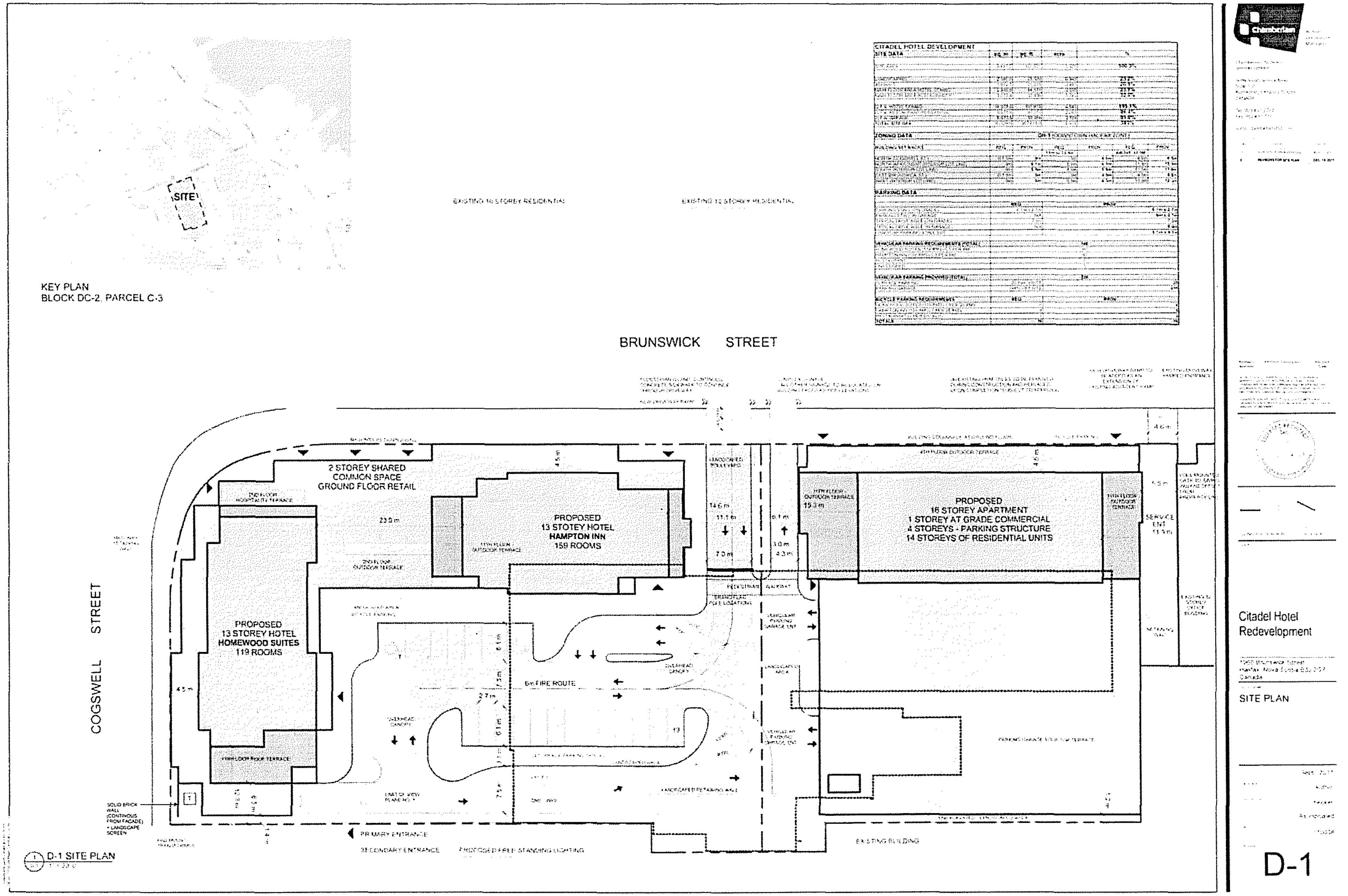
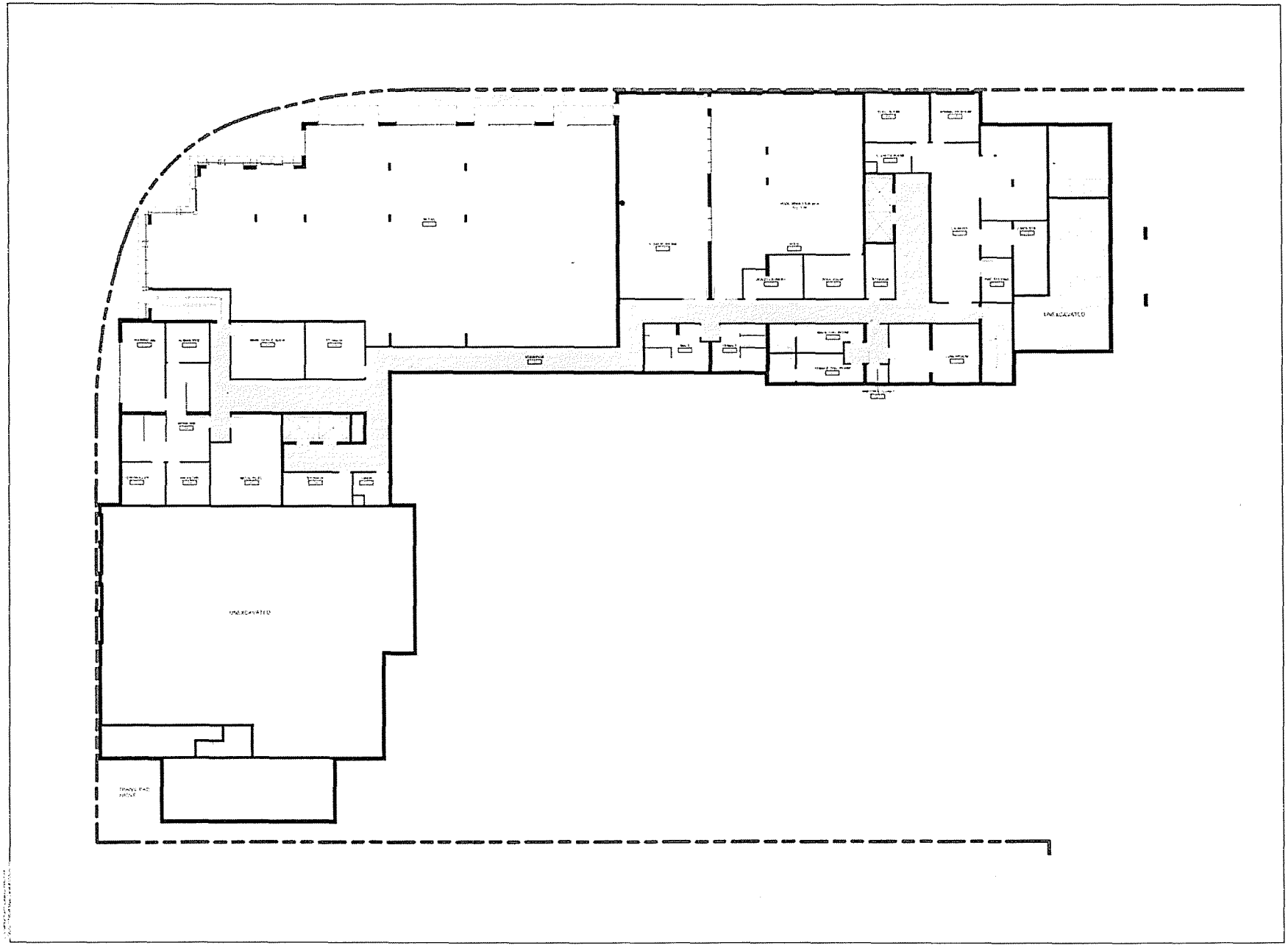


Case 17442 - Attachment A



Citadel Hotel
Redevelopment

1960 Brunswick Street
Halifax, Nova Scotia B3J 2G7
Canada

GROUND FLOOR

Sept. 2011

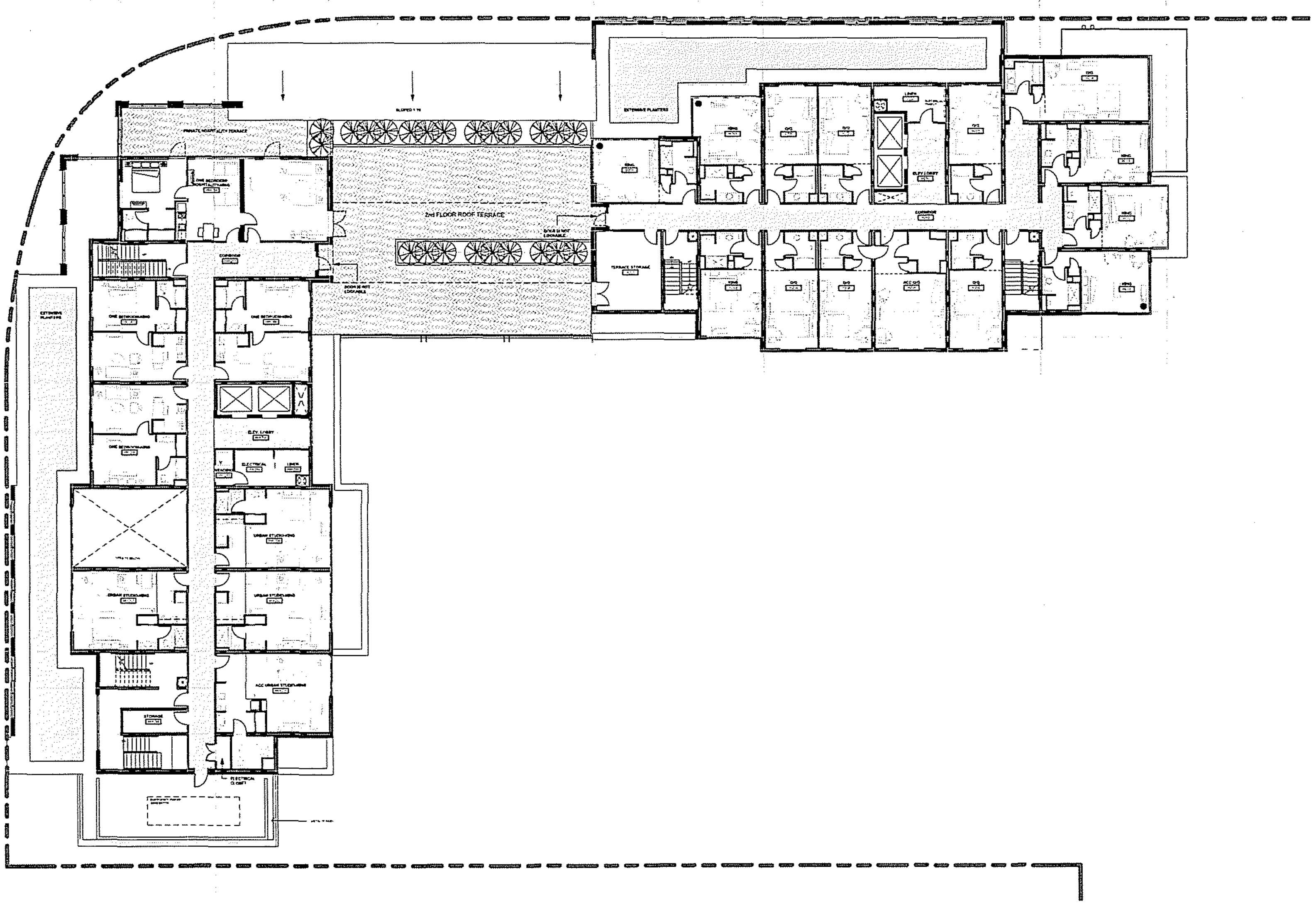
DRC

Checker

3/32" = 1'-0"

110038

D-2



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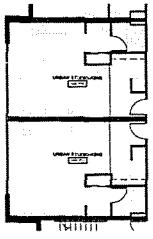
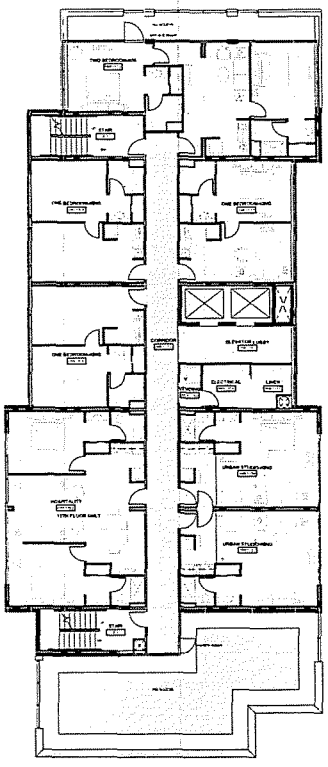
SECOND FLOOR

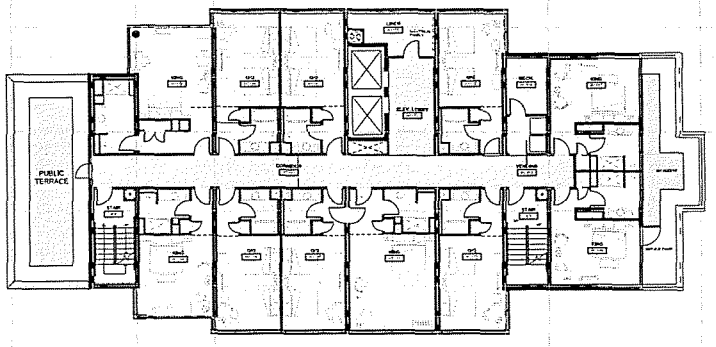
	Sept., 2011
	Author
	Checker
	3/32" = 1'-0"
	110038

D-4



11TH AND 12TH FLOOR





Hotel Areas

Floor	Area pr Floor	Floor Area (sq ft)

Hamelwood - Room Mix

Floor	Urban Studio	One BR King	One BR Q Q	Two Bedroom	Acc Urban Studio	Hospitality Suite	Subtotal

Hampton - Room Mix

Floor	King	Queen Queen	ACC Q Q	Subtotal

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NO.	ISSUED	DATE
1	FOR SITE PLAN APPROVAL	NOV. 7, 2011
2	RESUBMISSION SITE PLAN	DEC. 19, 2011

Revision Number	Revision Description	Revision Date

CONSTRUCTION NORTH

TRUE NORTH

Citadel Hotel Redevelopment

1960 Brunswick Street
Halifax, Nova Scotia B3J 2G7
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TYPICAL FLOOR (11-13)

Start Date	Sept., 2011
Designed By	Author
Checked By	Checker
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Project No.	110038

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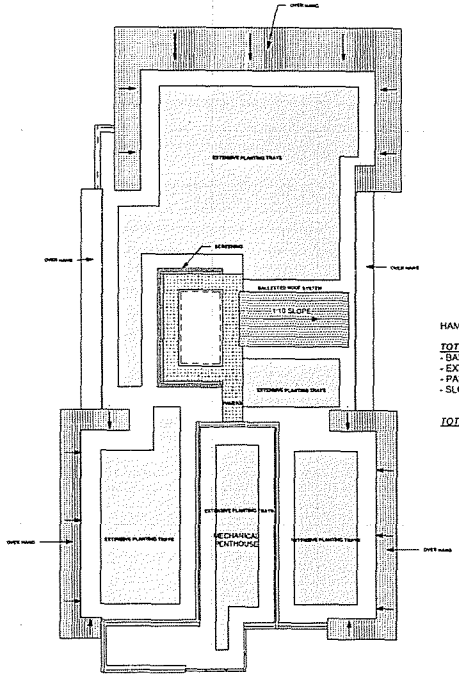
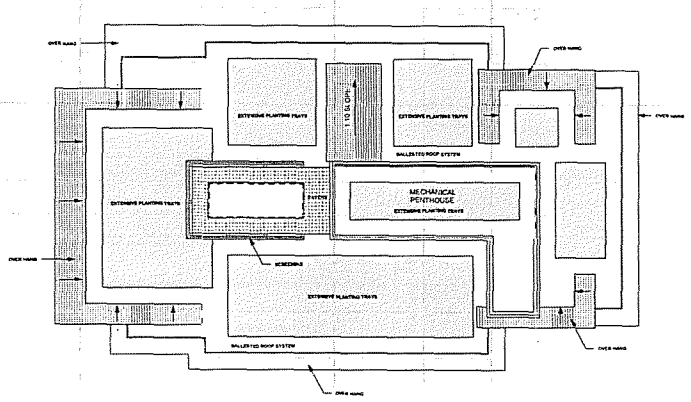


HAMPTON ROOF COVERAGES

TOTAL ROOF AREA	=	*6061 sq.ft*
- BALLESTED AREA	=	2843 sq.ft
- EXTENSIVE PLANTINGS	=	2768 sq.ft
- PAVER AREA	=	225 sq.ft
- SLOPED ROOF AREA	=	225 sq.ft
TOTAL OVER HANG AREA	=	*1519 sq.ft*



HAMPTON ROOF COVERAGES

TOTAL ROOF AREA	=	*5533 sq.ft*
- BALLESTED AREA	=	2780 sq.ft
- EXTENSIVE PLANTINGS	=	2339 sq.ft
- PAVER AREA	=	214 sq.ft
- SLOPED ROOF AREA	=	200 sq.ft
TOTAL OVER HANG AREA	=	*1568 sq.ft*

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NO.	ISSUED	DATE
1	FOR SITE PLAN APPROVAL	NOV. / 2011
2	REVISIONS FOR SITE PLAN	OCT. 19 2011

Revision No./Letter	Revision Description	Revision Date

CONSTRUCTION NORTH | TRUE NORTH

Citadel Hotel Redevelopment

1960 Brunswick Street
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Canada

ROOF PLAN

START DATE	Sept., 2011
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PROJECT NO.	110038
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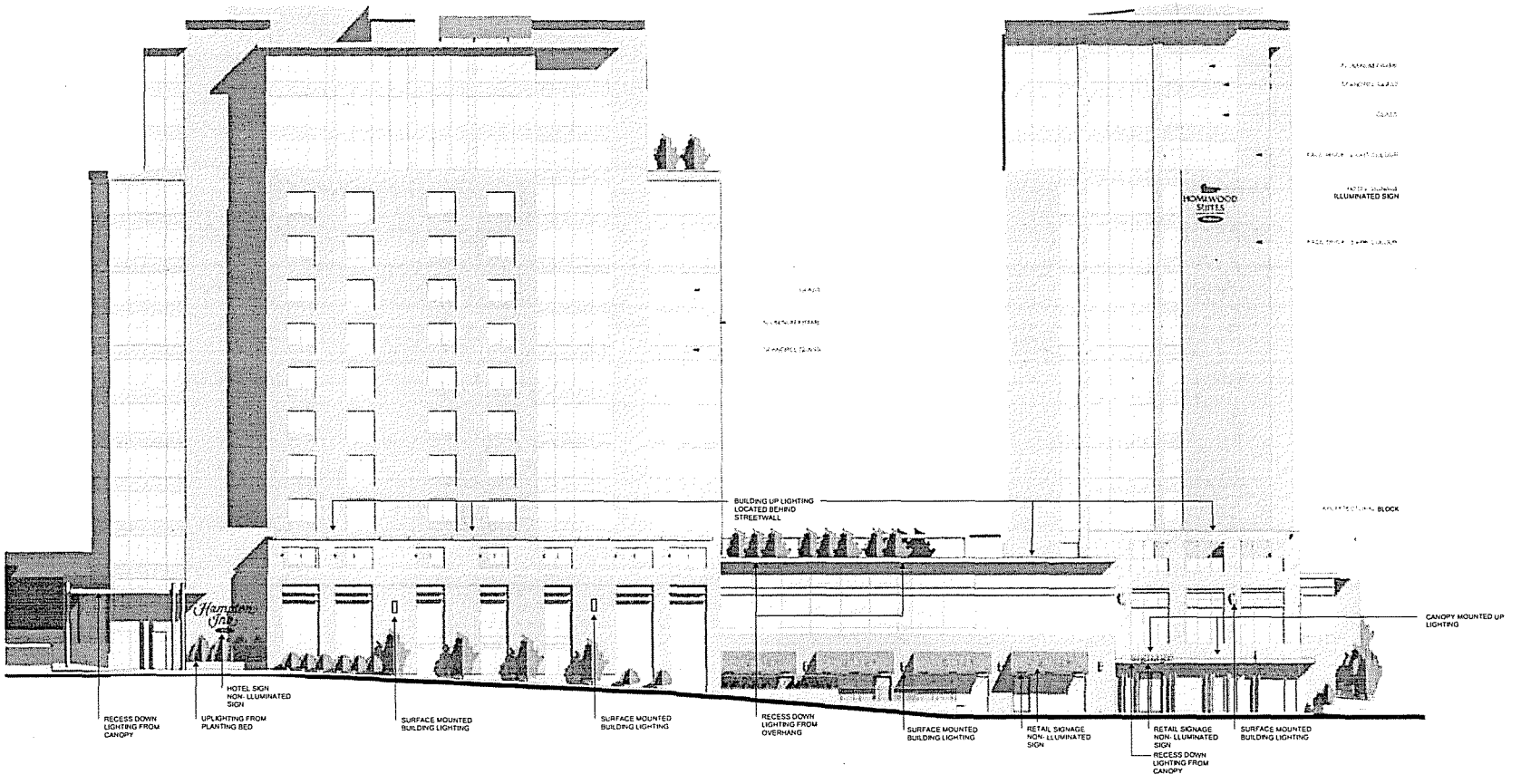

Citadel Hotel
Redevelopment

1960 Brunswick Street
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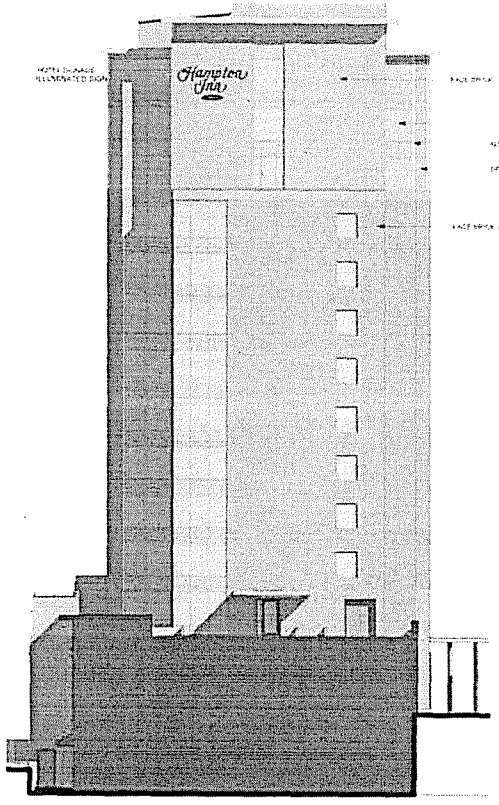
EAST ELEVATION

D-11



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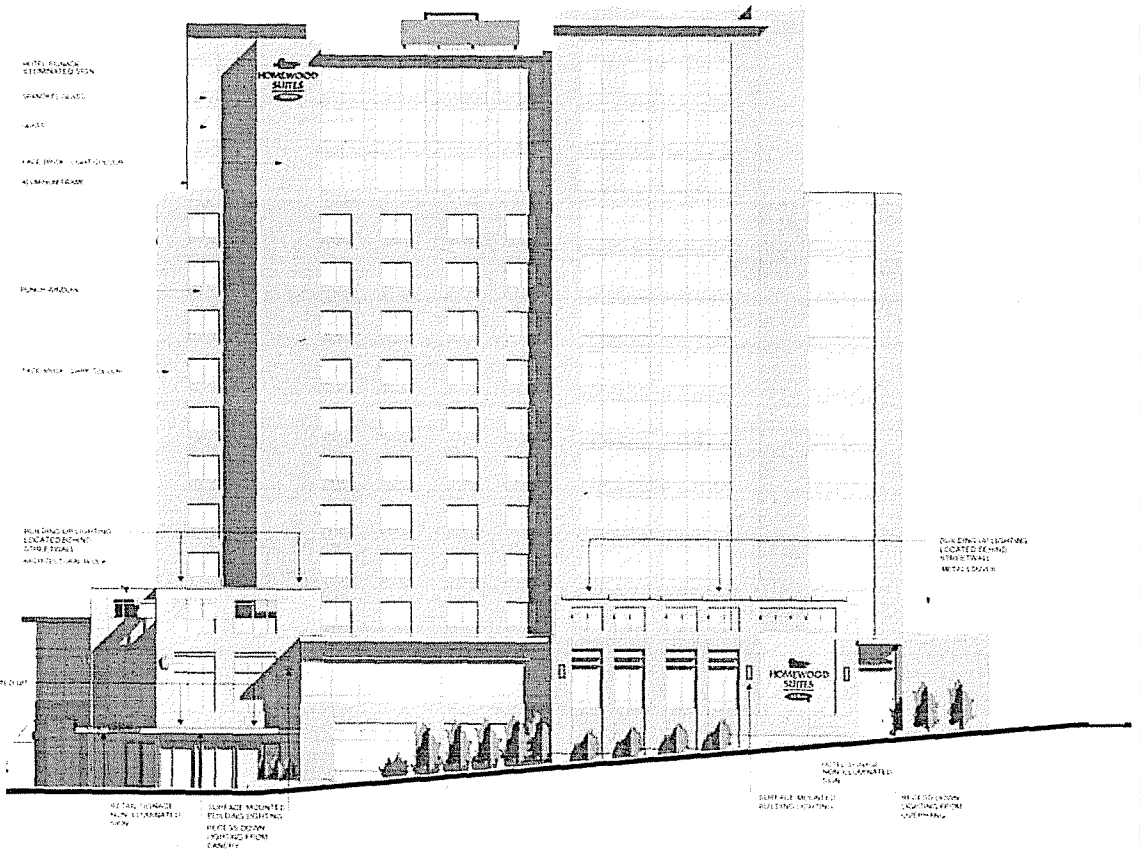

D-12 NORTH ELEVATION
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Citadel Hotel
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NORTH ELEVATION

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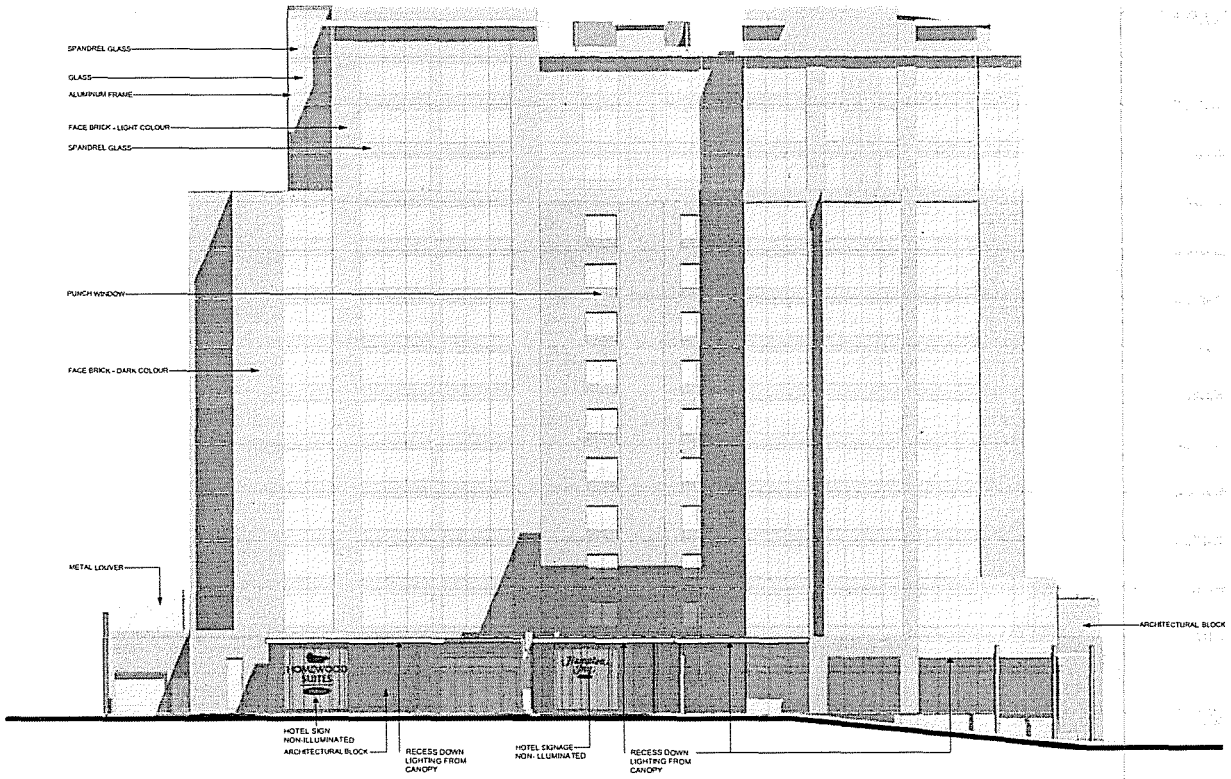

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2	RE-ISSUED FOR SPA PLANS	DEC. 14 2011

Revision Number	Revision Description	Revision Date

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Citadel Hotel Redevelopment

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SHEET NAME

SOUTH ELEVATION

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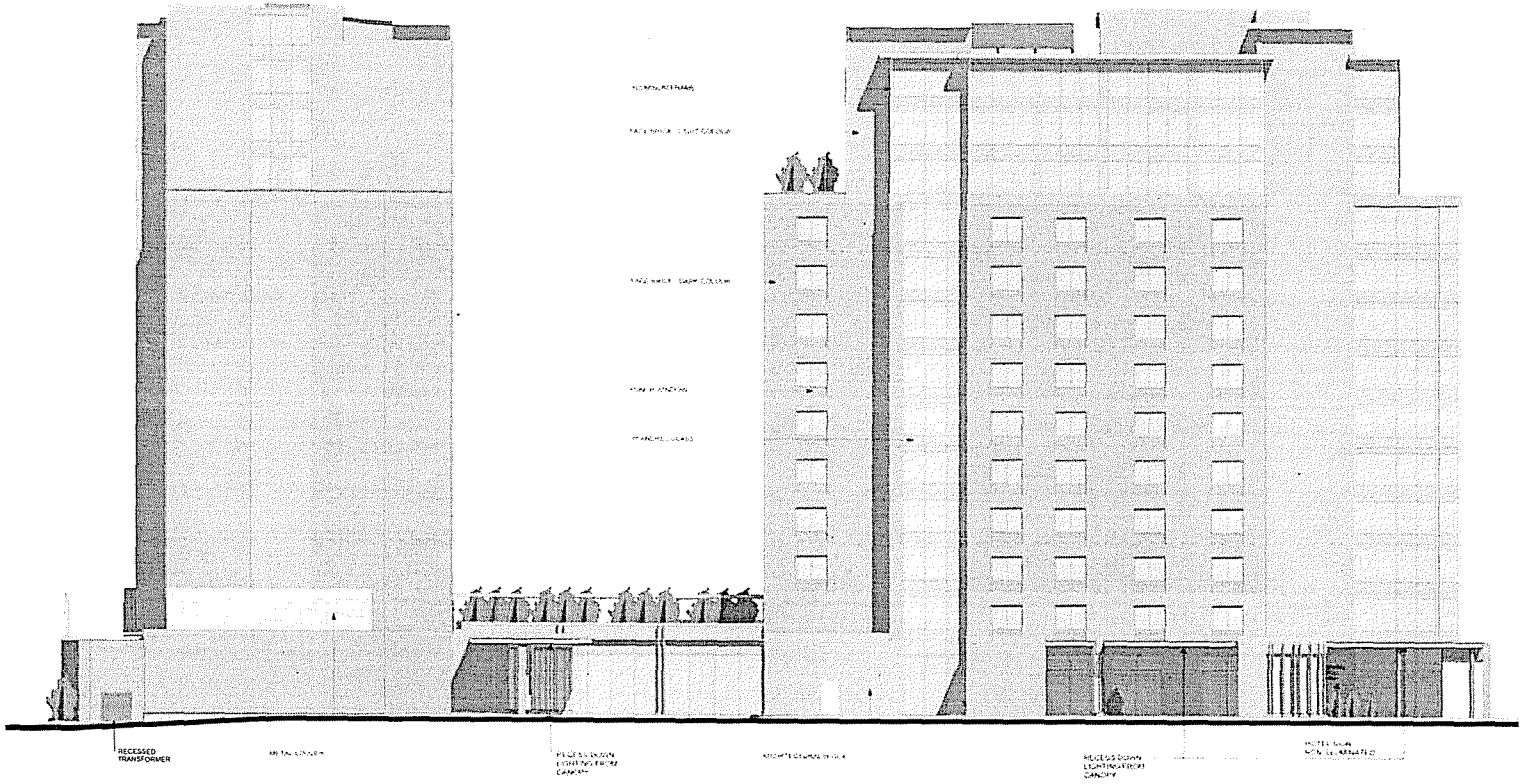

Citadel Hotel
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WEST ELEVATION

Sept 2011

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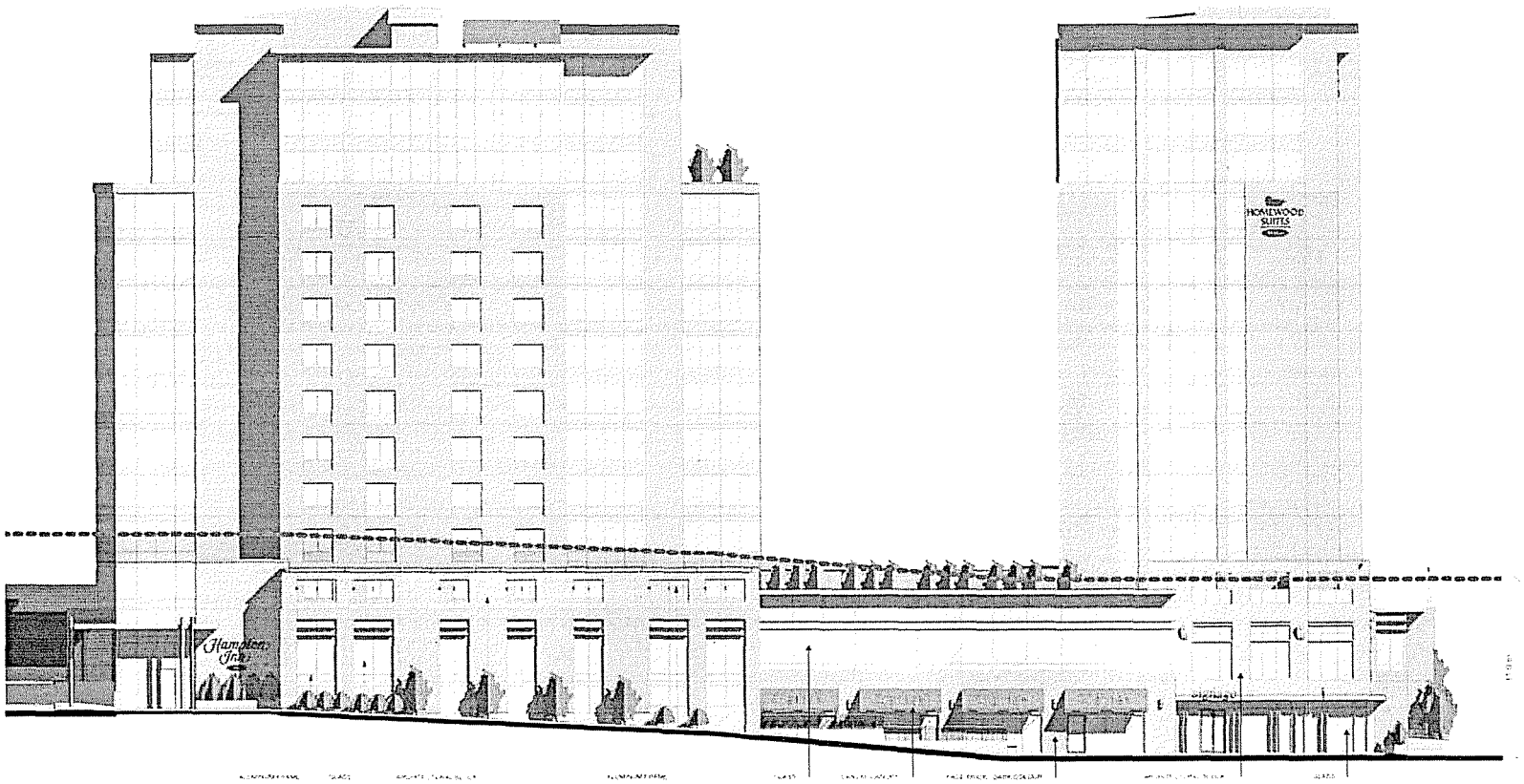

LEGEND

DESIRED STREET WALL HEIGHT

PROPERTY LINE

Citadel Hotel
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EAST ELEVATION

Sept. 2011

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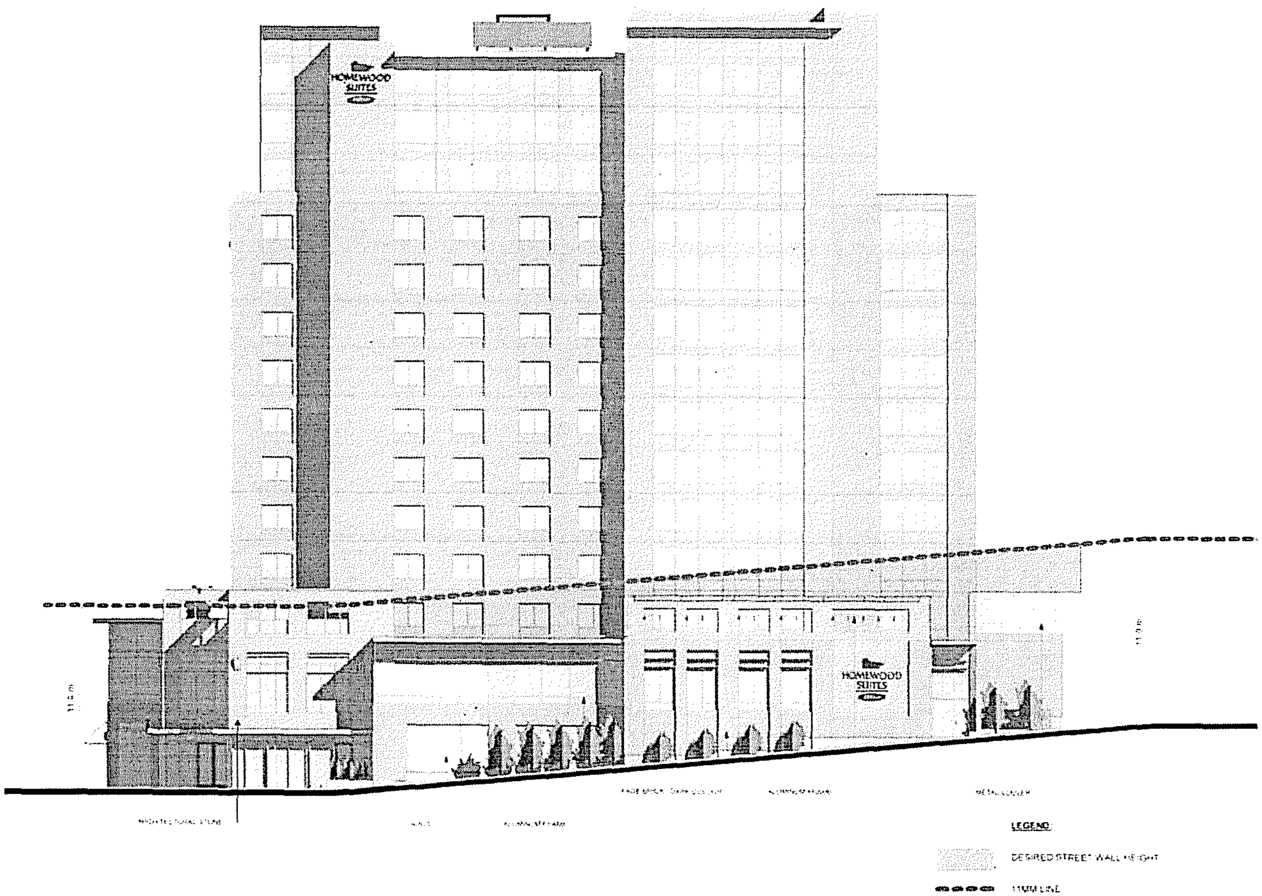

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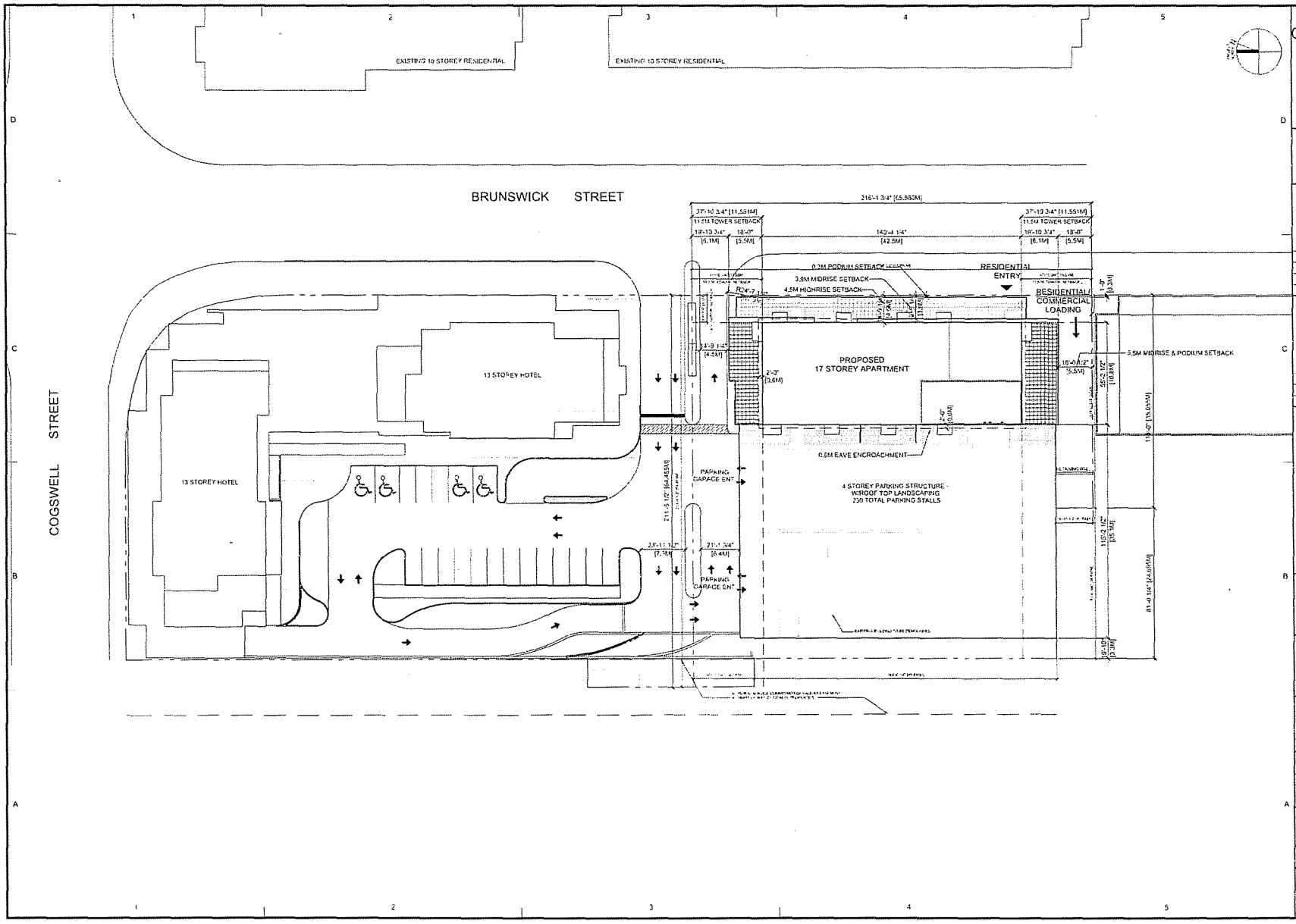

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REVISIONS

SEAL

URBAN CONSULTANT

IBI GROUP

PROJECT TITLE

Citadel Hotel Redevelopment

1960 Brunswick ST. Halifax, Nova Scotia

PROJECT NO:	39778
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CHKD BY:	JH
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SHEET TITLE

Site Plan

SHEET NUMBER: DP 0.02

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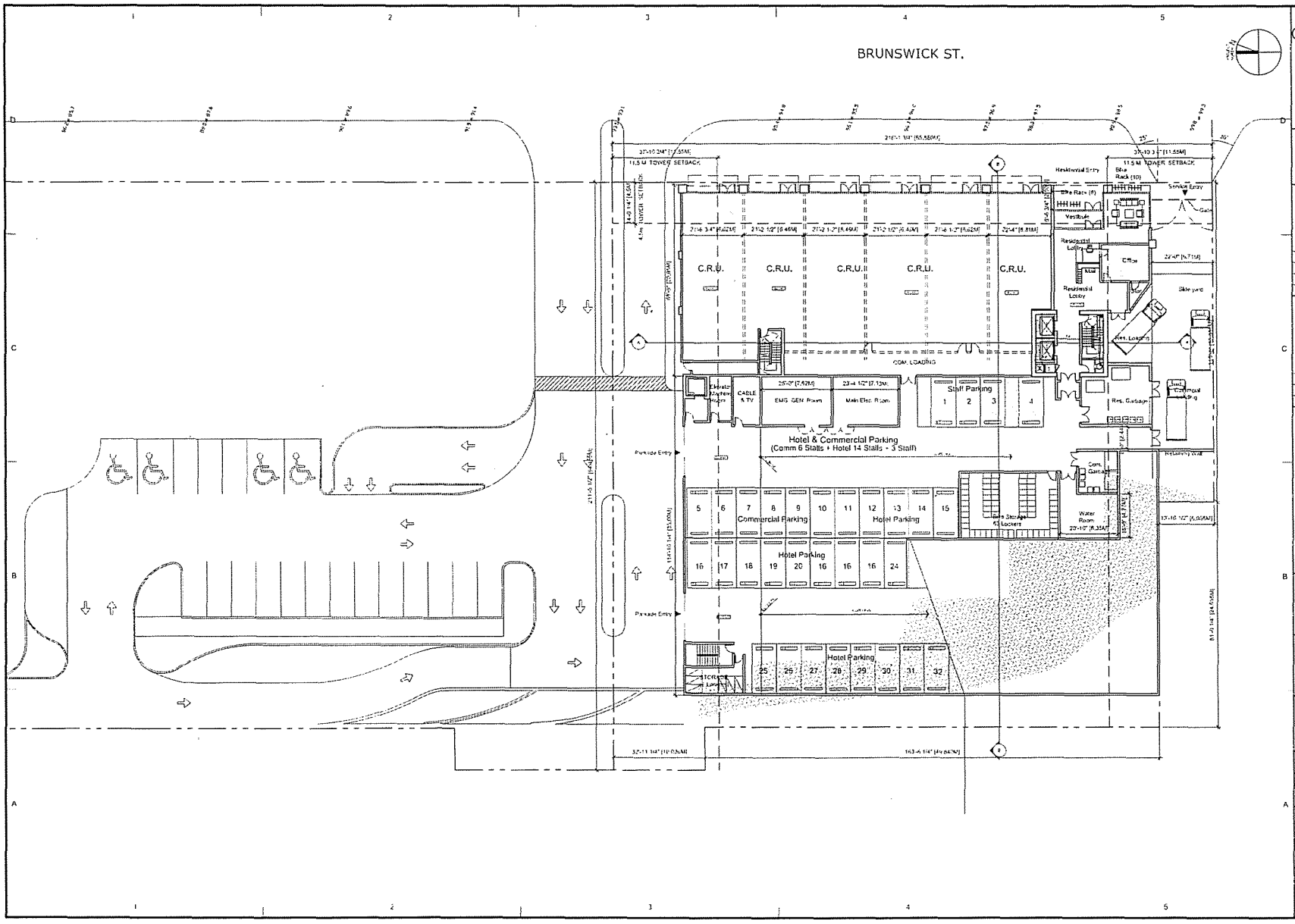

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REVISIONS

SEAL

CONSULTANT

IBI GROUP

PROJECT TITLE

Citadel Hotel Redevelopment

1960 Brunswick ST. Halifax, Nova Scotia

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CHKD BY:	JH
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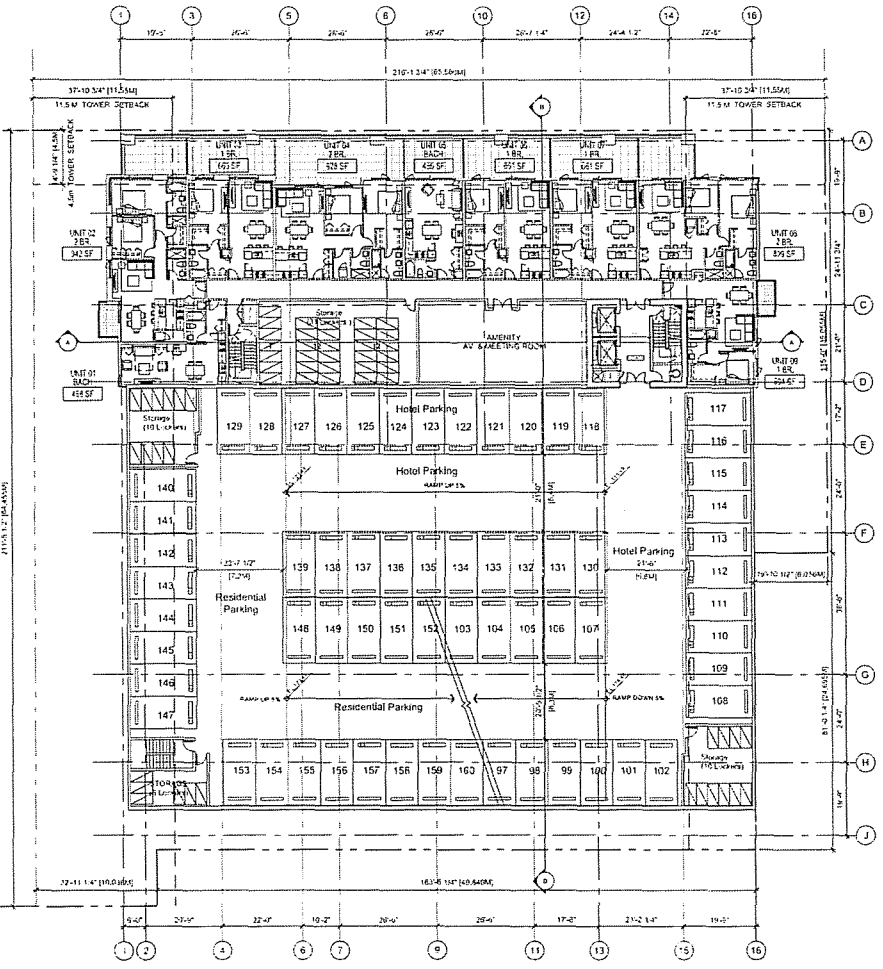
GROUND LEVEL

SHEET NUMBER

DP 1.01

REV.



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ISSUED

NO.	DATE	APPR.	DESCRIPTION

REVISIONS

SEAL

SUBCONSULTANTS

MAIN CONSULTANT

IBI GROUP

PROJECT TITLE

Citadel Hotel Redevelopment

1960 Brunswick ST, Halifax, Nova Scotia

PROJECT NO.	10775
DRAWN BY:	FK
CHKD BY:	JH
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SHEET TITLE

LEVEL 03 PLAN

SHEET NUMBER

DP 1.03

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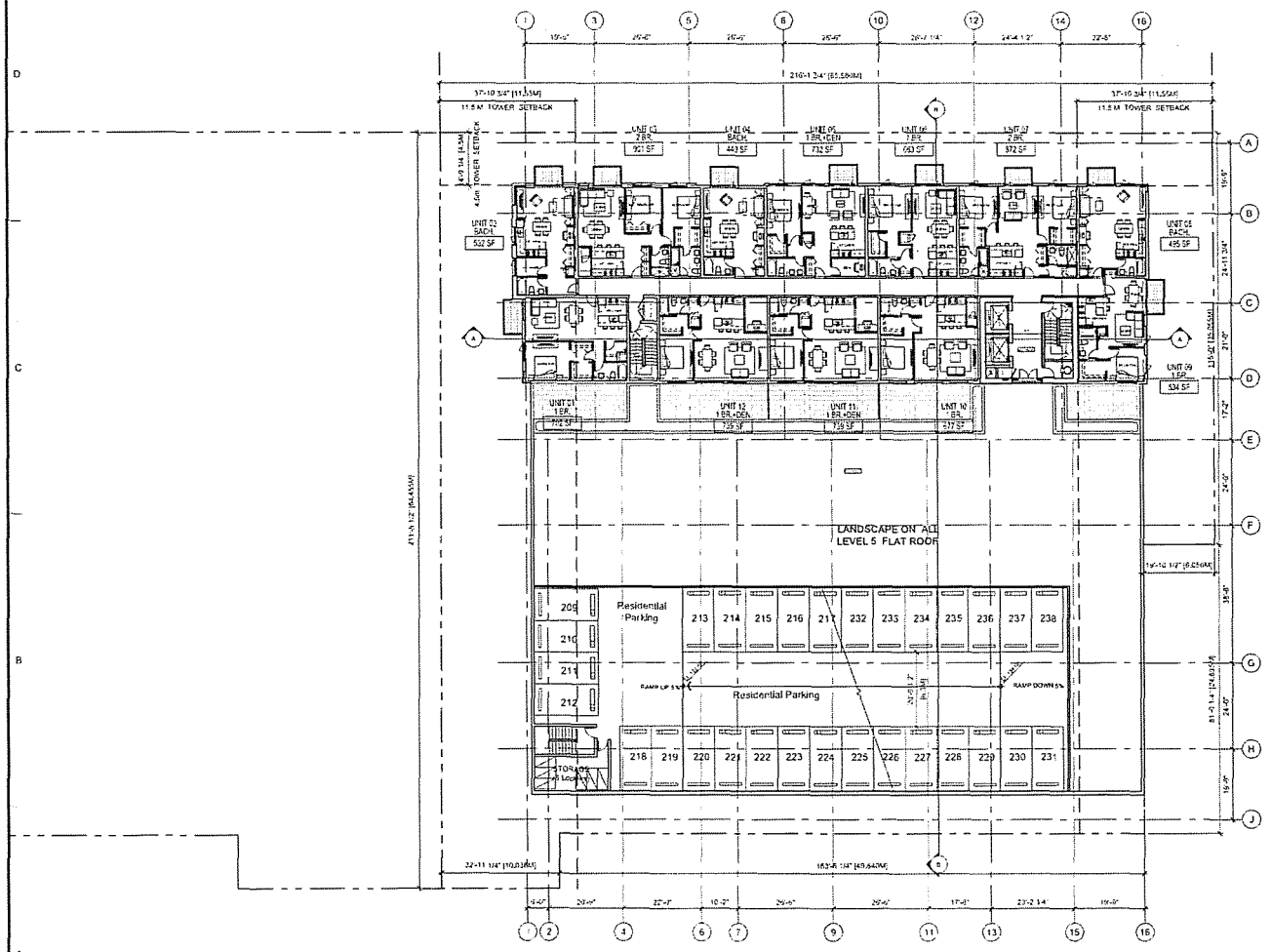

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Vancouver, B.C. V6B 4N7

NO.	DATE	DESCRIPTION
02	2011.12.01	DEVELOPMENT PERMIT
01	2011.11.01	DEVELOPMENT PERMIT

ISSUES

NO.	DATE	APPR	DESCRIPTION

REVISIONS

SEAL

SUB-CONSULTANT

HOME CONSULTANT
IBI GROUP

PROJECT TITLE
Citadel Hotel Redevelopment

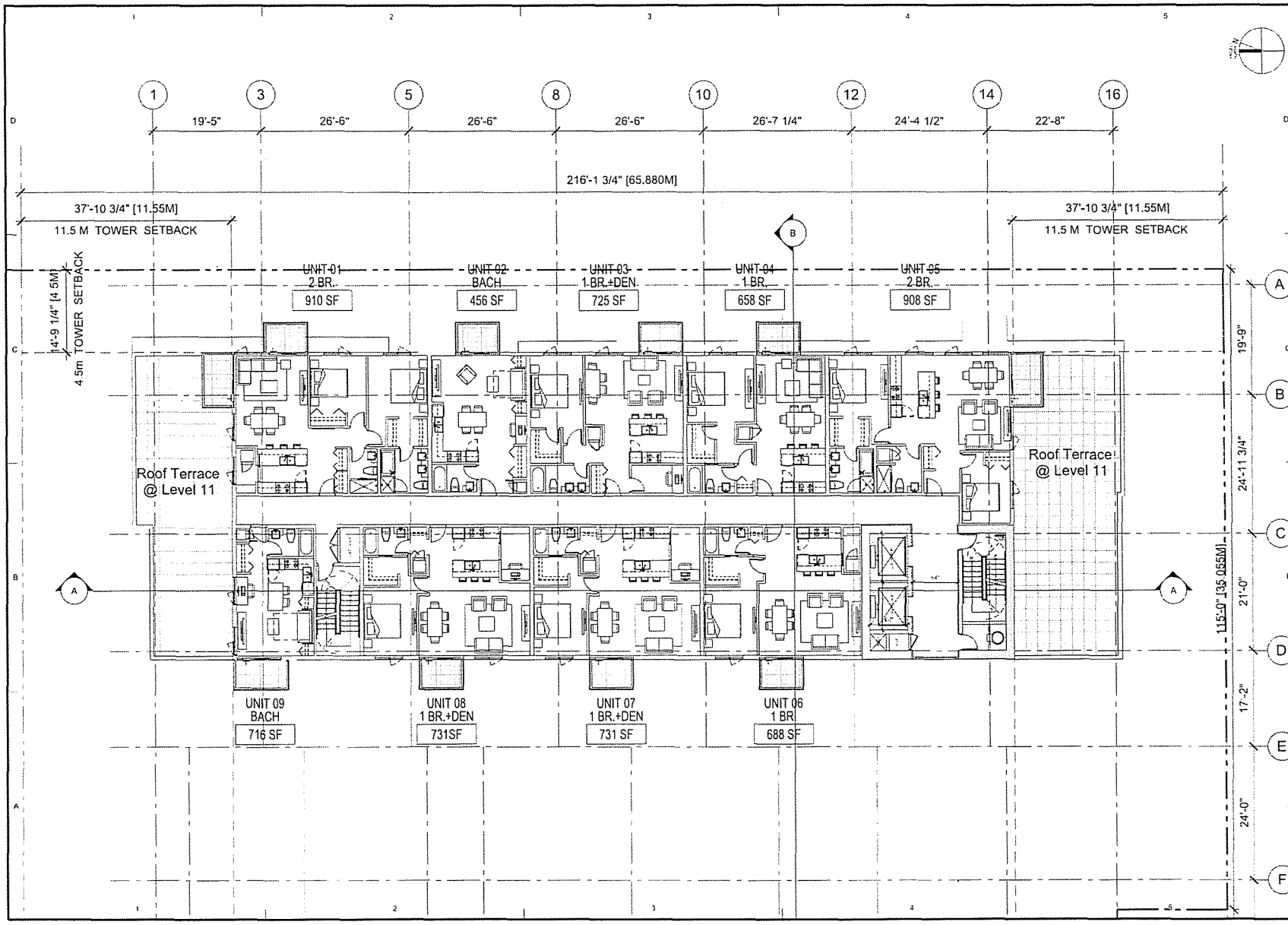
1960 Brunswick ST. Halifax, Nova Scotia

PROJECT NO: 30775
DRAWN BY: FK
CHECKED BY: JH
SCALE: 1/16"=1'-0"
DATE: December 16, 2011

SHEET TITLE
LEVEL 05 PLAN

SHEET NUMBER
DP 1.05

REV



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ISSUES

NO.	DATE	APP'D	DESCRIPTION

REVISIONS

SEAL

SUB-CONSULTANT

PRIME CONSULTANT
IBI GROUP

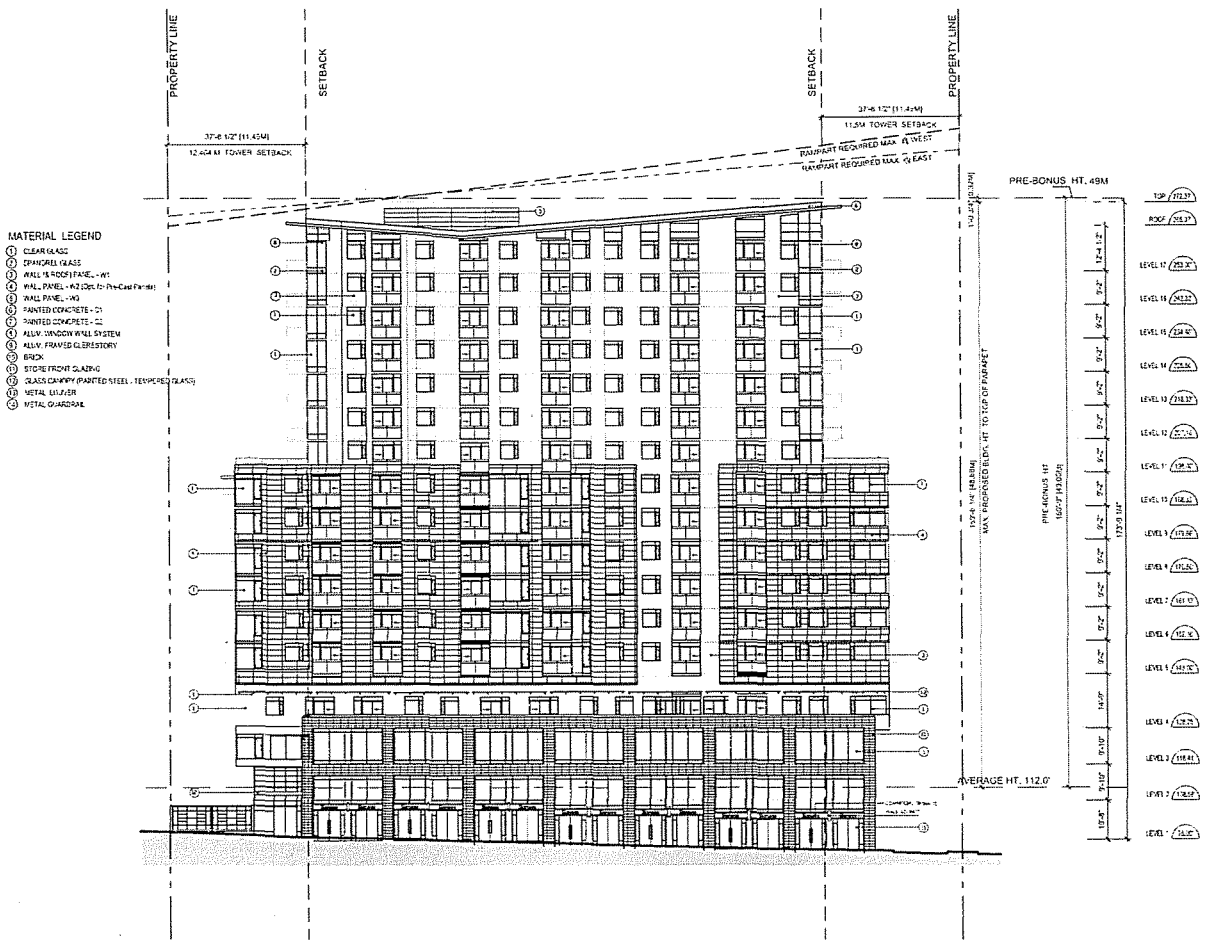
PROJECT TITLE
Citadel Hotel Redevelopment
1960 Brunswick ST. Halifax, Nova Scotia

PROJECT NO:	10775
DRAWN BY:	FK
CHKD BY:	JH
SCALE:	1/8" = 1'-0"
DATE:	December 1, 2011

SHEET TITLE
LEVEL 11-17 PLAN

SHEET NUMBER
DP 1.07

REV.



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ISSUES

NO.	DATE	APPR.	DESCRIPTION

REVISIONS

SEAL

SUB-CONSULTANT

PRIME CONSULTANT

IBI GROUP

PROJECT TITLE

Citadel Hotel Redevelopment

1960 Brunswick ST. Halifax, Nova Scotia

PROJECT NO:	39775
DRAWN BY:	ESM
CHKD BY:	JH
SCALE:	1/16"=1'-0"
DATE:	December 15, 2011

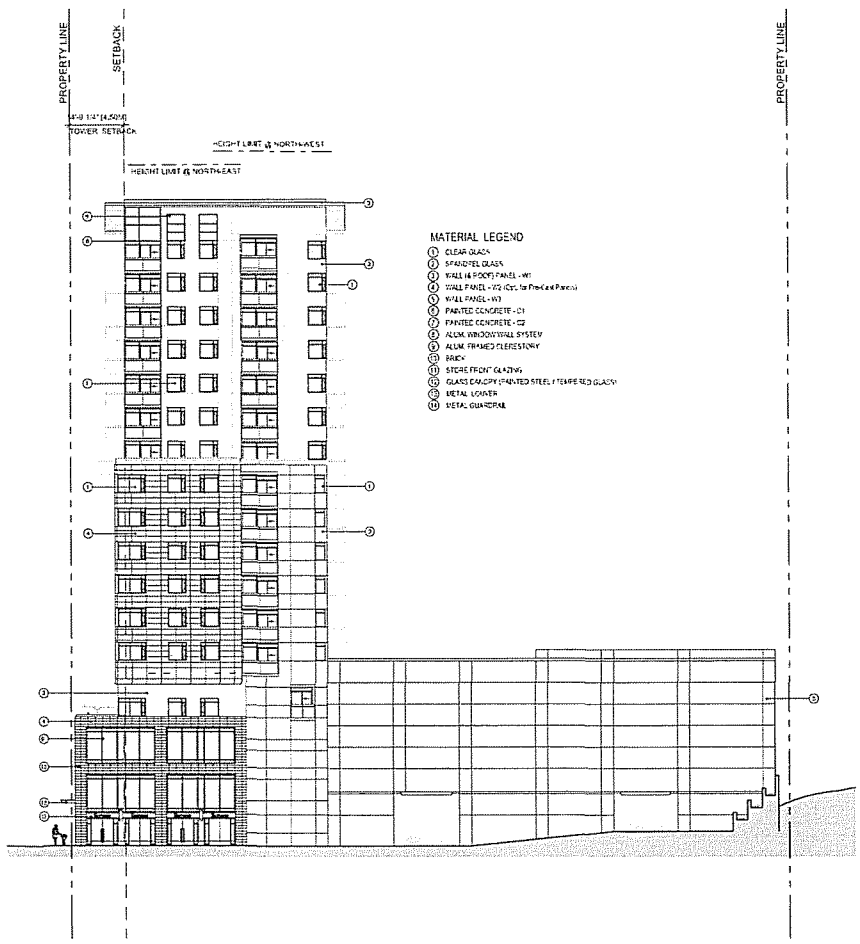
SHEET TITLE

EAST ELEVATION

SHEET NUMBER

DP 2.01

REV.



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NO.	DATE	APP'D	DESCRIPTION

REVISIONS

SEAL

SUB-CONSULTANT

IBI GROUP

PROJECT TITLE

Citadel Hotel Redevelopment

1960 Brunswick ST, Halifax, Nova Scotia

PROJECT NO:	10775
DRAWN BY:	ESM
CHKD BY:	JH
SCALE:	1/16"=1'-0"
DATE:	December 2, 2011

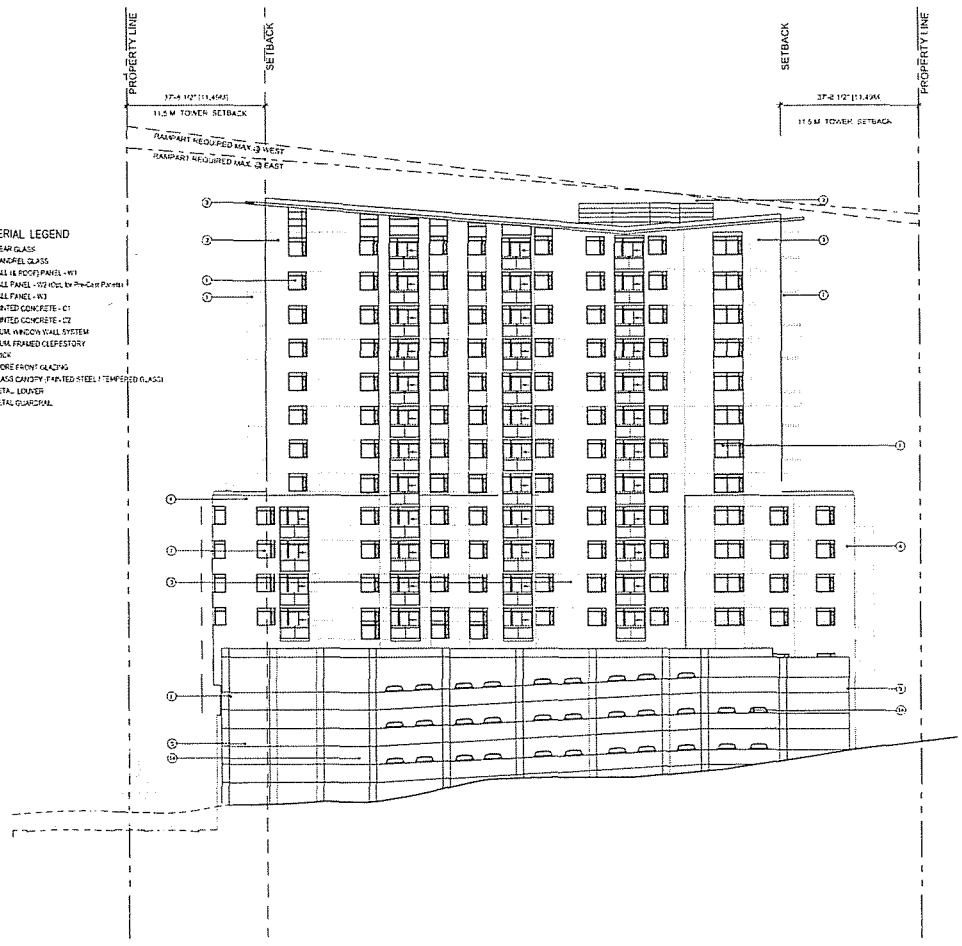
SHEET TITLE

NORTH ELEVATION

SHEET NUMBER

DP 2.02

REV.



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NO.	DATE	DESCRIPTION
02	2011-12-01	DEVELOPMENT PERMIT
01	2011-11-01	DEVELOPMENT PERMIT

ISSUES

NO.	DATE	APP'D	DESCRIPTION

REVISIONS

SEAL

SUBCONSULTANTS

PRIME CONSULTANT

IBI GROUP

PROJECT TITLE

Citadel Hotel Redevelopment

1960 Brunswick ST. Halifax, Nova Scotia

PROJECT NO:	30775
DRAWN BY:	FK
CHKD BY:	JH
SCALE:	3/16"=1'-0"
DATE:	December 2, 2011

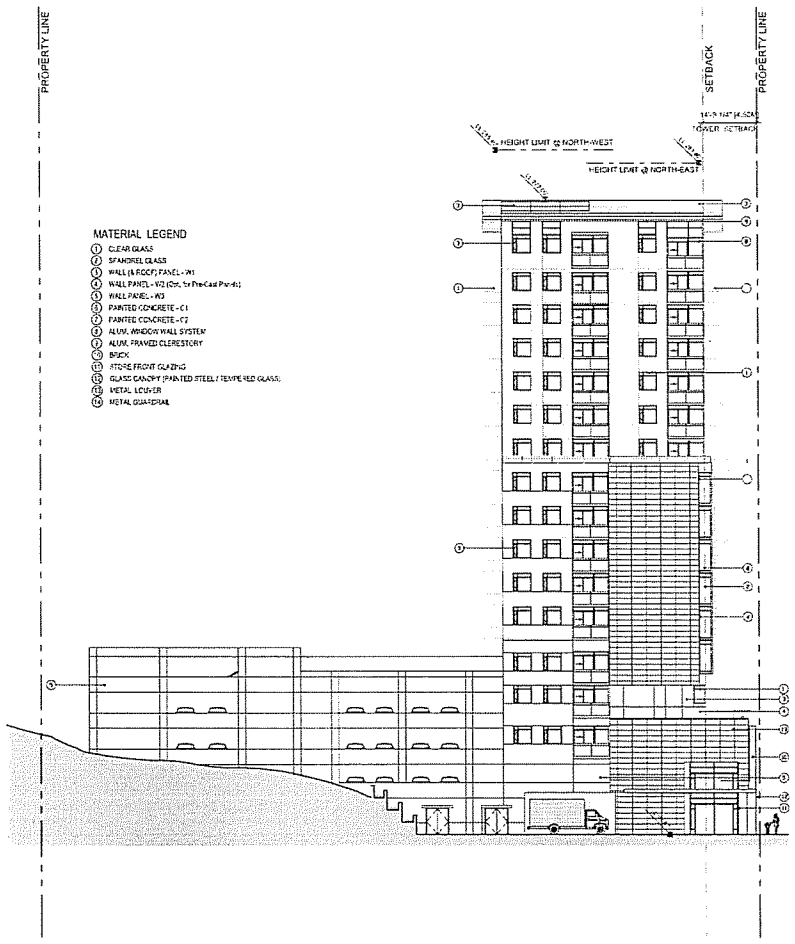
SHEET TITLE

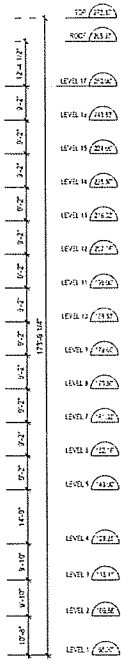
WEST ELEVATION

SHEET NUMBER

DP 2.03

REV





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ISSUES

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REVISIONS

SEAL

SUB-CONSULTANT

PRIME CONSULTANT

IBI GROUP

PROJECT TITLE

Citadel Hotel Redevelopment

1960 Brunswick ST, Halifax, Nova Scotia

PROJECT NO:	10775
DRAWN BY:	FK
CHKD BY:	JH
SCALE:	1/16"=1'-0"
DATE:	December 2, 2011

SHEET TITLE

SOUTH ELEVATION

SHEET NUMBER

DP 2.04

REV.

CITADEL HOTEL SITE REDEVELOPMENT

DESIGN RATIONALE

1960 BRUNSWICK STREET
HALIFAX, NOVA SCOTIA

This design rationale pertains to Case 17179 "The Citadel Hotel Redevelopment" by Chamberlain and IBI Architects, on behalf of SilverBirch Developments and Great West Life. The development is a mixed-use complex that contains two 13 storey hotels, on the northern portion of the site, with a total of 278 rooms, associated facilities and retail. On the southern portion is a 140 unit 18 storey residential tower, with a proposed restaurant at grade on Brunswick Street. Parking for 218 cars is provided in a structure behind the residential tower and in 20 surface parking spaces screened in the back of the hotel towers. The site is in the Downtown Halifax, DH 1 zone, within the Cogswell Precinct. The site slopes significantly to a low point at the Cogswell/Brunswick corner.

The Built Form has been developed in accordance with Halifax Regional Municipality (HRM) Downtown Halifax Land Use By-law, and the Design Manual (schedule S-1).

A podium level built to the property lines, strongly defines the street edge, in accordance with Sections 2.8 d and 3.1, of the Design Manual. This portion of the design provided an interesting challenge for both designing firms. The Brunswick St. and Cogswell St. corner slopes dramatically down both streets. These slopes have played a key role in the formulation of the massing in both plan and elevation. The creativity of both firms has satisfied the goals of Section 3.2 of the Design Manual, with interactive gradation of building façades, quality materials and architectural expression, producing a fine grained character and pedestrian interest. This is increase with large windows providing transparency into retail, lobby and restaurant uses. Weather protection above also provides a comfortable environment for pedestrians. Having only one vehicular access for both building components, minimizes the break in the Streetwall and maintains the required percentage of width. On the residential tower, the streetwall complies with the 11m minimum required in Section 3.1.3 of the Design Manual. In the hotel component, the increased slope and the desire to provide interest, by breaking down the scale of the podium, results in slight variations from this requirement, and a variance is therefore requested.

Above, the buildings step back in accordance with the requirements of the DH 1 zone, both above the podium and in the tower portions, creating a distinctive, base, middle and top. Setbacks are also observed from the side and rear property lines and between the tower portions. The overall height of all three towers is within the Citadel ramparts view requirements, and outside the Citadel view corridors.

The hotel towers, have been examined at great length to achieve aesthetically pleasing facades of masonry and glazing that complement the existing vernacular and also portray and vibrancy of a new commercial wing to the downtown core. Section 3.3 of the Design Manual is embraced, with columns which provide strong vertical elements to articulate and break down the scale, and link the base, middle and tower portions. A high percentage of fenestration, including significant use of curtainwall accents, verticals and prominent corners with clean modern lines. High quality materials including the extensive use of brick, complements the buildings in the surrounding area without detracting from Heritage aspects. Green roofs have

been integrated on the second level terrace, and on the top of both hotel towers, observing the requirements of Sections 3.3.4 and Section 3.5 of the Design Manual.

The residential tower, also has a distinct base, middle and top. On grade level, storefront glazing, masonry, and weather protection create human scale frontages, as outlined in Section 3.2 of the Design Manual.

Above the podium, the elements of the facade have been arranged to break down the scale and provide interest and sculpting to what is a fairly wide building. Accenting verticals, integration of balconies and varying height, all further contribute to meeting the objectives of Section 3.3 of the Design Manual. Contemporary materials such as metal panels, with punched windows, complement the buildings in the area and create a design which is different and yet in the family established by the hotel towers. On the top the use of a large "butterfly roof" adds interest and meets the objectives of Section 3.3.4 of the Design Manual.

The parking structure, has been located behind the residential tower, where it is screened from the street, as well, the two floors that project through the residential tower, are fully integrated into the design, and above the street, meeting the intent of Section 3.5.2 of the Design Manual. The roof of the parking structure is treated as required in Section 3.3.4. The surface parking for the hotel is also screened from the street and incorporated landscaping as recommended in Section 3.5.3.

Through careful project development, design manual consideration and contextual influence the project team has been able to keep both hotel towers and residential tower under the 49m bonusing height. In addition the residential component will be designed (but not registered) to a LEED silver level, achieving many of the sustainable goals in Section 5 of the Design Manual.

As a requirement of the preliminary permit review, a wind study has been commissioned. As results have been made available, recommendations have been incorporated into the final design.

It is the intent of both architectural teams to continue to evolve the design through the permit review to produce a final product that both the City and developers can be proud of.

Requested Variance: 3.1.3 Streetwall Height

The streetwall of the hotel towers runs the entire length of the hotel (almost 68m on Brunswick and over 40m on Cogswell). Over these distances the site slopes significantly to the Brunswick/Cogswell corner. To provide variety in height as the building steps down to the corner and to provide interest and articulation of the facades, the street-wall is broken into three sections on each street. While the 11m minimum height requirement in Section 3.1.3 of the Design Manual is generally achieved and even exceeded, there are sections - due to the sloping site, the design objectives and the floor and ceiling levels - where the streetwall dips slightly below this minimum requirement. On Brunswick the maximum variance is 1.6m and on Cogswell, due to the increased slope, the maximum variance is 3.3m. Please refer to the drawings which illustrate this in the submission.

Citadel Hotel
Redevelopment

1960 Brunswick Street
Halifax, Nova Scotia B3J 2G7
Canada

CORNER VIEW

D-8

Case 17442 - Attachment C

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Constructors
Managers

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CONSTRUCTION NORTH   TRUE NORTH

Citadel Hotel
Redevelopment

1960 Brunswick Street
Halifax, Nova Scotia B3J 2G7
Canada

Retail Corner

START DATE	Sept., 2011
DRAWN BY	Author
CHECKED BY	Checker
SCALE	
PROJECT NO.	110038
DRAWING	D-9

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Chamberlain Architects Managers

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NO.	ISSUED	DATE
1	FOR SITE PLAN APPROVAL	NOV. 7 2011
2	REVISIONS FOR SITE PLAN	DEC 15 2011

Revision Number	Revision Description	Revision Date

Citadel Hotel Redevelopment

1960 Brunswick Street
Halifax, Nova Scotia B3J 2G7
Canada

COURTYARD VIEW

Issued date	Sept., 2011
Drawn by	JM
Checked by	Checker
Scale	
Project No.	110038

D-10

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Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
2	**Downtown Precinct Guide lines**			
2.8	**Precinct 8: Cogswell Area**			
2.8a	Remove the interchange infrastructure and reestablish streets, blocks, and open spaces that are an extension and reinforcement of the historic downtown grid and that provide connectivity between the north end and downtown.			•
2.8b	Encourage the historic downtown grid to be reinstated as redevelopment occurs.			•
2.8c	Allow high-rise, mixed-use development comprised of relatively large podiums with point towers so as to maintain views of the water.	•		
2.8d	Focus pedestrian activities at sidewalk level through the provision of weather protected sidewalks using well-designed canopies and awnings.		•	
2.8e	Define the area with modern landmark buildings.	•		
2.8f	Redevelop larger existing sites such as Scotia Square and Purdy's Wharf with street-oriented infill.	•		
2.8g	Provide for public access and open space on the waterfront lands which shall include continuous public access at the water's edge and green space at the terminus of each east-west street extension (i.e. Cogswell).			•
2.8h	Require that development step down to the water's edge and to the existing low-rise neighbourhoods to the north.			•
2.8i	Enhance important vistas and focal points such as the view of the water.			•
2.8j	Ensure that there are pedestrian-oriented street level uses, particularly at water's edge and fronting open spaces.	•		
2.8k	Encourage intensification of underdeveloped existing sites such as the Trademart building and the police station.	•		
2.8l	Consider this precinct as being an important location for new transit and parking facilities.			•

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
2.8m	Permit surface parking lots only when they are an accessory use and are in compliance with the Land Use By-Law and design guidelines.	•		
2.8n	Architectural and open space design shall respond to the significant grade changes in this area. Refer to Section 3.2.5 of the Design Manual for further guidance.	•		
3	**General Design Guidelines**			
3.1	**The Streetwall**			
3.1.1	**Pedestrian-Oriented Commercial** On certain downtown streets pedestrian-oriented commercial uses are required to ensure a critical mass of activities that engage and animate the sidewalk These streets will be defined by streetwalls with continuous retail uses and are shown on Map 3 of the Land Use By-law.			•
3.1.2	**Streetwall Setback** *(refer to Map 6)*			
3.1.2a	Minimal to no Setback (0-1.5m): Corresponds to the traditional retail streets and business core of the downtown. Except at corners or where an entire block length is being redeveloped, new buildings should be consistent with the setback of the adjacent existing buildings.		•	
3.1.3	**Streetwall Height** *(refer to Map 7)* To ensure a comfortable human-scaled street enclosure, streetwall height should generally be no less than 11 metres and generally no greater than a height proportional (1:1) to the width of the street as measured from building face to building face. Accordingly, maximum streetwall heights are defined and correspond to the varying widths of downtown streets – generally 15.5m, 17m or 18.5m. Consistent with the principle of creating strong edges to major public open spaces, a streetwall height of 21.5m is permitted around the perimeter of Cornwallis Park. Maximum Streetwall Heights are shown on Map 7 of the Land Use By-law.		•	
3.2	**Pedestrian Streetscapes**			
3.2.1	**Design of the Streetwall**			
3.2.1a	The streetwall should contribute to the 'fine grained'	•		

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
	character of the streetscape by articulating the façade in a vertical rhythm that is consistent with the prevailing character of narrow buildings and storefronts.			
3.2.1b	The streetwall should generally be built to occupy 100% of a property's frontage along streets.	•		
3.2.1c	Generally, streetwall heights should be proportional to the width of the right of way, a 1:1 ratio between streetwall height and right of way width. Above the maximum streetwall height, further building heights are subject to upper storey stepbacks.	•		
3.2.1d	In areas of contiguous heritage resources, streetwall height should be consistent with heritage buildings.			•
3.2.1e	Streetwalls should be designed to have the highest possible material quality and detail.	•		
3.2.1f	Streetwalls should have many windows and doors to provide 'eyes on the street' and a sense of animation and engagement.	•		
3.2.1g	Along pedestrian frontages at grade level, blank walls shall not be permitted, nor shall any mechanical or utility functions (vents, trash vestibules, propane vestibules, etc.) be permitted.		•	
3.2.2	**Building Orientation and Placement**			
3.2.2a	All buildings should orient to, and be placed at, the street edge with clearly defined primary entry points that directly access the sidewalk.	•		
3.2.2b	Alternatively, buildings may be sited to define the edge of an on-site public open space, for example, plazas, promenades, or eroded building corners resulting in the creation of public space (see diagram at right). Such treatments are also appropriate for Prominent Visual Terminus sites identified on Map 9 of the Land Use By-law.	•		
3.2.2c	Sideyard setbacks are not permitted in the Central Blocks defined on Map 8 of the Land Use Bylaw, except where required for through-block pedestrian connections or vehicular access.			•
3.2.3	**Retail Uses**			

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
3.2.3a	All mandatory retail frontages (Map 3 of Land Use By-law) should have retail uses at-grade with a minimum 75% glazing to achieve maximum visual transparency and animation.			•
3.2.3b	Weather protection for pedestrians through the use of well-designed awnings and canopies is required along mandatory retail frontages (Map 3) and is strongly encouraged in all other areas.		•	
3.2.3c	Where retail uses are not currently viable, the grade-level condition should be designed to easily accommodate conversion to retail at a later date.	•		
3.2.3d	Minimize the transition zone between retail and the public realm. Locate retail immediately adjacent to, and accessible from, the sidewalk.	•		
3.2.3e	Avoid deep columns or large building projections that hide retail display and signage from view.	•		
3.2.3f	Ensure retail entrances are located at or near grade. Avoid split level, raised or sunken retail entrances. Where a changing grade along a building frontage may result in exceedingly raised or sunken entries it may be necessary to step the elevation of the main floor slab to meet the grade changes.	•		
3.2.3g	Commercial signage should be well designed and of high material quality to add diversity and interest to retail streets, while not being overwhelming.		•	
3.2.4	**Residential Uses**			
3.2.4a	Individually accessed residential units (i.e. town homes) should have front doors on the street, with appropriate front yard privacy measures such as setbacks and landscaping. Front entrances and first floor slabs should be raised above grade level for privacy, and should be accessed through means such as steps, stoops and porches.			•
3.2.4b	Residential units accessed by a common entrance and lobby may have the entrance and lobby elevated or located at grade-level, and the entrance should be clearly recognizable from the exterior through appropriate	•		

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
	architectural treatment.			
3.2.4c	Projects that feature a combination of individually accessed units in the building base with common entrance or lobby-accessed units in the upper building, are encouraged.			•
3.2.4d	Units with multiple bedrooms (2 and 3 bedroom units) should be provided that have immediately accessible outdoor amenity space. The amenity space may be at-grade or on the landscaped roof of a podium.	•		
3.2.4e	Units provided to meet housing affordability requirements shall be uniformly distributed throughout the development and shall be visually indistinguishable from market-rate units through the use of identical levels of design and material quality.			•
3.2.4f	Residential uses introduced adjacent to pre-existing or concurrently developed eating and drinking establishments should incorporate acoustic dampening building materials to mitigate unwanted sound transmission.			•
3.2.5	**Sloping Conditions**			
3.2.5a	Maintain active uses at-grade, related to the sidewalk, stepping with the slope. Avoid levels that are distant from grade.	•		
3.2.5b	Provide a high quality architectural expression along facades. Consider additional detailing, ornamentation or public art to enhance the experience.	•		
3.2.5c	Provide windows, doors and other design articulation along facades; blank walls are not permitted.	•		

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
3.2.5d	Articulate the façade to express internal floor or ceiling lines; blank walls are not permitted.	•		
3.2.5e	Wrap retail display windows a minimum of 4.5 metres around the corner along sloping streets, where retail is present on the sloping street.	•		
3.2.5f	Wherever possible, provide pedestrian entrances on sloping streets. If buildings are fully accessible at other entrances, consider small flights of steps or ramps up or down internally to facilitate entrances on the slope.	•		
3.2.5g	Flexibility in streetwall heights is required in order to transition from facades at a lower elevation to facades at higher elevations on the intersecting streets. Vertical corner elements (corner towers) can facilitate such transitions, as can offset or "broken" cornice lines at the top of streetwalls on sloping streets.		•	
3.2.6	**Elevated Pedestrian Walkways** *(not applicable)*			
3.2.7	**Other Uses** *(not applicable)*			
3.3	**Building Design**			
3.3.1	**Building Articulation**			
3.3.1a	To encourage continuity in the streetscape and to ensure vertical 'breaks' in the façade, buildings shall be designed to reinforce the following key elements through the use of setbacks, extrusions, textures, materials, detailing, etc.: • Base: Within the first four storeys, a base should be clearly defined and positively contribute to the quality of the pedestrian environment through animation, transparency, articulation and material quality. • Middle: The body of the building above the base should contribute to the physical and visual quality of the overall streetscape. • Top: The roof condition should be distinguished from the rest of the building and designed to	•		

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
	contribute to the visual quality of the skyline.			
3.3.1b	Buildings should seek to contribute to a mix and variety of high quality architecture while remaining respectful of downtown's context and tradition.	•		
3.3.1c	To provide architectural variety and visual interest, other opportunities to articulate the massing should be encouraged, including vertical and horizontal recesses or projections, datum lines, and changes in material, texture or colour.	•		
3.3.1d	Street facing facades should have the highest design quality, however, all publicly viewed facades at the side and rear should have a consistent design expression.	•		
3.3.2	**Materials**			
3.3.2a	Building materials should be chosen for their functional and aesthetic quality, and exterior finishes should exhibit quality of workmanship, sustainability and ease of maintenance.	•		
3.3.2b	Too varied a range of building materials is discouraged in favour of achieving a unified building image.	•		
3.3.2c	Materials used for the front façade should be carried around the building where any facades are exposed to public view at the side or rear.	•		
3.3.2d	Changes in material should generally not occur at building corners.	•		
3.3.2e	Building materials recommended for new construction include brick, stone, wood, glass, in-situ concrete and pre-cast concrete.	•		
3.3.2f	In general, the appearance of building materials should be true to their nature and should not mimic other materials.	•		
3.3.2g	Stucco and stucco-like finishes shall not be used as a principle exterior wall material.	•		
3.3.2h	Vinyl siding, plastic, plywood, concrete block, EIFS (exterior insulation and finish systems where stucco is applied to rigid insulation), and metal siding utilizing exposed fasteners are prohibited.	•		

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
3.3.2i	Darkly tinted or mirrored glass is prohibited. Clear glass is preferrable to light tints. Glare reduction coatings are preferred.	•		
3.3.2j	Unpainted or unstained wood, including pressure treated wood, is prohibited as a building material for permanent decks, balconies, patios, vernadas, porches, railings and other similar architectural embellishments, except that this guidelines shall not apply to seasonal sidewalk cafes.	•		
3.3.3	**Entrances**			
3.3.3a	Emphasize entrances with such architectural expressions as height, massing, projection, shadow, punctuation, change in roof line, change in materials, etc.	•		
3.3.3b	Ensure main building entrances are covered with a canopy, awning, recess or similar device to provide pedestrian weather protection.	•		
3.3.3c	Modest exceptions to setback and stepback requirements are possible to achieve these goals.	•		
3.3.4	**Roof Line and Roofscapes**			
3.3.4a	Buildings above six storeys (mid and high-rise) contribute more to the skyline of individual precincts and the entire downtown, so their roof massing and profile must include sculpting, towers, night lighting or other unique features.	•		
3.3.4b	The expression of the building 'top' (see previous) and roof, while clearly distinguished from the building 'middle', should incorporate elements of the middle and base such as pilasters, materials, massing forms or datum lines.	•		
3.3.4c	Landscaping treatment of all fl at rooftops is required. Special attention shall be given to landscaping rooftops in precincts 3, 5, 6 and 9, which abut Citadel Hill and are therefore pre-eminently visible. The incorporation of living "green roofs" is strongly encouraged.	•		
3.3.4d	Ensure all rooftop mechanical equipment is screened from view by integrating it into the architectural design of the building and the expression of the building 'top'. Mechanical rooms and elevator and stairway head-houses should be incorporated into a single well-	•		

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
	designed roof top structure. Sculptural and architectural elements are encouraged to add visual interest.			
3.3.4e	Low-rise flat roofed buildings should provide screened mechanical equipment. Screening materials should be consistent with the main building design. Sculptural and architectural elements are encouraged for visual interest as the roofs of such structures have very high visibility.			•
3.3.4f	The street-side design treatment of a parapet should be carried over to the back-side of the parapet for a complete, finished look where they will be visible from other buildings and other high vantage points.		•	
3.4	**Civic Character** *(not applicable)*			
3.5	**Parking Services and Utilities**			
3.5.1	**Vehicular Access, Circulation, Loading and Utilities**			
3.5.1a	Locate parking underground or internal to the building (preferred), or to the rear of buildings.	•		
3.5.1b	Ensure vehicular and service access has a minimal impact on the streetscape, by minimizing the width of the frontage it occupies, and by designing integrated access portals and garages.	•		
3.5.1c	Locate loading, storage, utilities, areas for delivery and trash pick up out of view from public streets and spaces, and residential uses.	•		
3.5.1d	Where access and service areas must be visible from or shared with public space, provide high quality materials and features that can include continuous paving treatments, landscaping and well designed doors and entries.			•
3.5.1e	Coordinate and integrate utilities, mechanical equipment and meters with the design of the building, for example, using consolidated rooftop structures or internal utility rooms.	•		
3.5.1f	Locate heating, venting and air conditioning vents away from public streets. Locate utility hook-ups and equipment (i.e. gas meters) away from public streets and to the sides and rear of buildings, or in underground vaults.		•	

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
3.5.2	**Parking Structures**			
3.5.2a	Where multi-storey parking facilities are to be integrated into new developments they should be visually obscured from abutting streets by wrapping them with 'sleeves' of active uses.	•		
3.5.2b	Animated at-grade uses should occupy the street frontage, predominantly retail, with 75% transparency.	•		
3.5.2c	At-grade parking access and servicing access to retail stores should be provided to the rear and concealed from the street.		•	
3.5.2d	Provide articulated bays in the façade to create fine-grained storefront appearance.	•		
3.5.2e	Provide pedestrian amenities such as awnings, canopies, and sheltered entries.	•		
3.5.2f	Provide façade treatment that conceals the parking levels and that gives the visual appearance of a multi-storey building articulated with 'window' openings.		•	
3.5.2g	Design of parking structures such that they can be repurposed to other uses (i.e. level floor slabs) is encouraged.		•	
3.5.2h	Provide cap treatment (at roof or cornice line) that disguises views of rooftop parking and mechanical equipment.			•
3.5.2i	Utilize high quality materials that are compatible with existing downtown buildings.	•		
3.5.2j	Locate pedestrian access to parking at street edges, with direct access. Ensure stairs to parking levels are highly		•	

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
	visible from the street on all levels.			
3.5.2k	Ensure all interior and exterior spaces are well lit, inclusive of parking areas, vehicular circulation aisles, ramps, pedestrian accesses, and all entrances.		•	
3.5.2l	Maintain continuous public access to parking at all hours and in all seasons.			•
3.5.2m	Minimize the width and height of vehicular access points to the greatest practical extent.	•		
3.5.2n	Provide clear sightlines for vehicles and pedestrians at sidewalks, by setting back columns and walls, and providing durable low maintenance mirrors.	•		
3.5.2o	Bicycle parking must be provided in visible at grade locations, and be weather-protected.	•		
3.5.3	**Surface Parking**			
3.5.3a	Surface lots shall be located out of sight behind buildings or inside city blocks rather than adjacent to streets or at corners.	•		
3.5.3b	Surface lots shall only be moderate in size (10-20 cars) for the handicapped and visitors, and must include bicycle parking opportunities.	•		
3.5.3c	Surface parking shall be designed to include internal landscaping or hardscaping on islands at the ends of each parking aisle, clearly marked pedestrian access and paths, lighting and be concealed with landscaped buffers or other mitigating design measures.	•		
3.5.3d	In addition to landscaping, a variety of hardscaping materials should be used to add visual texture and reduce apparent parking lot scale. Landscaping should be low	•		

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
	maintenance.			
3.5.4	**Lighting** *(see main body of the report)*			
3.5.4a	Attractive landscape and architectural features can be highlighted with spot-lighting or general lighting placement.	•		
3.5.4b	Consider a variety of lighting opportunities inclusive of street lighting, pedestrian lighting, building up- or down-lighting, internal building lighting, internal and external signage illumination (including street addressing), and decorative or display lighting.	•		
3.5.4c	Illuminate landmark buildings and elements, such as towers or distinctive roof profiles.	•		
3.5.4d	Encourage subtle night-lighting of retail display windows.	•		
3.5.4e	Ensure there is no 'light trespass' onto adjacent residential areas by the use of shielded "full cutoff" fixtures.	•		
3.5.4f	Lighting shall not create glare for pedestrians or motorists by presenting unshielded lighting elements in view.	•		
3.5.5	**Signs** *(see main body of the report)*			
3.5.5a	Integrate signs into the design of building facades by placing them within architectural bay, friezes or datum lines, including coordinated proportion, materials and colour.	•		
3.5.5b	Signs should not obscure windows, cornices or other architectural elements.	•		
3.5.5c	Sign scale should reinforce the pedestrian scale of the downtown, through location at or near grade level for viewing from sidewalks.	•		
3.5.5d	Large freestanding signs (such as pylons), signs on top of rooftops, and large scale advertising (such as billboards) are prohibited.	•		
3.5.5e	Signs on heritage buildings should be consistent with traditional sign placement such as on a sign band,			•

Attachment D – Design Manual Checklist				
Section	**Guideline**	**Complies**	**Discussion**	**N/A**
	window lettering, or within architectural orders.			
3.5.5f	Street addressing shall be clearly visible for every building.			•
3.5.5g	The material used in signage shall be durable and of high quality, and should relate to the materials and design language of the building.	•		
3.6	**Site Plan Variance**			
3.6.3	**Streetwall Height Variance**			
3.6.3a	the streetwall height is consistent with the objectives and guidelines of the Design Manual; and	•		
3.6.3b	the modification is for a corner element that is used to join streetwalls of differing heights; or	•		
3.6.3c	the streetwall height of abutting buildings is such that the streetwall height would be inconsistent with the character of the street; or	•		
3.6.3d	where a landmark building element is called for pursuant to the Design Manual			•

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Attachment E

Citadel Hotel Redevelopment

Halifax, Nova Scotia

Final Report

Pedestrian Wind Study

RWDI # 1102163
October 28, 2011

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Appendices

Appendix A: Drawing List for Model Construction

1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by SilverBirch Hotel and Resorts LP to conduct a Pedestrian Wind Study for the proposed Citadel Hotel Redevelopment in Halifax, Nova Scotia. The purpose of the study was to assess the wind environment around the development in terms of pedestrian comfort and safety. This objective was achieved through wind tunnel testing of a 1:400 scale model of the proposed development for the following configurations:

Configuration A - Existing: existing surroundings and hotel; and,

Configuration B - Proposed: existing surroundings with the proposed development.

The photographs in Figures 1a and 1b show the test model in RWDI's boundary-layer wind tunnel. The development consists of two 13-storey hotel towers situated upon a one-storey podium at the corner of Brunswick and Cogswell Streets, as well as a 15-storey apartment building including a 4 storey parking garage to the immediate south. The test model was constructed using the design information and drawings listed in Appendix A. This report summarizes the methodology of wind tunnel studies for pedestrian wind conditions, describes the RWDI pedestrian wind criteria, and presents the test results and conceptual wind control measures, where necessary.

The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site, and was reviewed by Chamberlain Architect Services Limited.

2. PRINCIPAL RESULTS

The results of the tests are discussed in detail in Section 5 of this report and may be summarized as follows:

- In the Existing Configuration, wind conditions were found to be suitable for the intended usage during both the summer and winter seasons.
- Wind conditions in the Proposed Configuration were generally suitable for the intended usage in the summer and winter. The design team should consider reducing wind speeds along the east facade of the Apartment building during the winter, through the use of mitigative design features.
- Wind speeds on the hotel podium terraces were slightly higher than desired; mitigation measures have been suggested and described.
- There were no wind safety failures, relating to gust events, in either configuration.

3. METHODOLOGY

As shown in Figures 1a and 1b, the wind tunnel model included the proposed development and all relevant surrounding buildings and topography within a 460 m radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modelled area were also simulated in RWDI's boundary layer wind tunnel. The model was instrumented with 60 wind speed sensors to measure mean and gust wind speeds at a full-scale height of approximately 1.5 m. These measurements were recorded for 36 equally incremented wind directions.

Wind statistics recorded at the Shearwater Airport between 1980 and 2009 were analysed for the Summer (May through October) and Winter (November through April) seasons. Figure 2 graphically depicts the distribution of wind frequency and directionality for the two seasons. When all wind records are considered, winds from the southwest quadrant are predominant in the summer, as indicated by the wind rose on the left of the figure. During the winter, winds from the northwest quadrant are predominant as indicated by the wind rose on the right of the Figure. Calm winds recorded at the airport occur for 6.3% of the time in the summer and 3.9% of the time in winter.

Strong winds of a mean speed greater than 30 km/h measured at the airport (at an anemometer height of 10m) occur for 2.6% and 11.6% of the time during the summer and winter seasons, respectively. Strong winds are evenly distributed among all directions during the summer, as indicated by the left-side rose. During the winter, strong winds from the west through the north are more frequent, as indicated by the right-side wind rose. Winds from these directions could potentially be the source of uncomfortable or even severe wind conditions, depending upon the site exposure or development design. The analysis methods have accounted for these and all wind directions.

Wind statistics from the Shearwater Airport were combined with the wind tunnel data in order to predict the frequency of occurrence of full-scale wind speeds. The full-scale wind predictions were then compared with the RWDI criteria for pedestrian comfort and safety.

4. EXPLANATION OF CRITERIA

The RWDI wind criteria deal with both pedestrian safety and comfort, as they relate to the force of the wind. Thermal effects (e.g., temperature, humidity, sun/shade, wind chill, etc.) are not considered in these comfort criteria. Gust speeds over a short period are critical in some circumstances, particularly where winds are very strong and pedestrians' footing and balance are involved. The mean wind speed can also affect pedestrian comfort in areas such as an outdoor cafe. The combined effect of mean and gust speeds can be quantified by a Gust Equivalent Mean (GEM) speed. GEM is the greater of either the mean speed, or the gust speed divided by 1.85, which is a gust factor typically used for wind comfort (References 1, 5, 7 and 8 in Section 7).

The GEM wind speed predicted for each test location on the model is compared to the RWDI wind criteria to determine pedestrian comfort, while the gust speed is used for the wind safety evaluation. The following table is an example of how these predicted results are presented in this report.

Example Table: Pedestrian Wind Comfort and Safety Categories

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**	
GEM Wind Speed (km/h)			0 - 10	0 - 14	0 - 19	> 19		Gust Speed ≥ 88km/h	
Category Limit			≥ 80%	≥ 80%	≥ 80%	> 20%		> 2 Events Seasonally	
Loc.	Config.	Season	%	%	%	%	**RATING**	Events	**RATING**
999	A	Summer	75	85	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	1	PASS
	B	Summer	65	80	90	10	Standing	2	PASS
		Winter	45	65	75	25	Uncomfortable	4	FAIL

Across the top of the Example Table there are four comfort categories:

- **Sitting:** wind speeds up to 10 km/h - Low wind speeds during which one can read a newspaper without having it blown away. Recommended for outdoor cafes and other amenity spaces that promote long term sitting.

- **Standing:** wind speeds up to 14 km/h - Slightly higher wind speeds that are strong enough to rustle leaves. These wind speeds are appropriate at major building entrances, bus stops or other areas, such as a bench along a sidewalk, where people may linger but not necessarily sit for extended periods of time.

- **Walking:** wind speeds up to 19 km/h - Winds that would lift leaves, move litter, hair and loose clothing. Appropriate for sidewalks, intersections, plazas, parks or playing fields where people are more likely to be active and receptive to some wind activity.

- **Uncomfortable:** wind speeds greater than 19 km/h - The effects of wind speeds at this level range from small trees swaying and wind force being felt on the body to whole trees being in motion and inconvenience being felt when walking. Winds of this magnitude are considered a nuisance for most activities, but can be acceptable depending upon the season and use of an area.

Along the left side of the Example Table, the sensor location, test configuration and season are listed. The subsequent four columns show the percentage of time that the winds are predicted to fall within the wind speed ranges for each comfort category. Wind conditions are considered acceptable for sitting, standing or walking if the wind speeds are within their specified ranges at least 80% of the time. Using this criterion, each location has been given a comfort RATING on the right side of the "COMFORT CATEGORY" section of the table. Pedestrian activities other than the wind comfort category rating can

still take place in the area; however, the percentage of time that the wind will be comfortable for other activities may be less than the desired 80% criterion.

For example, at Location 999 in the Example Table, the summer wind conditions are identified as comfortable for sitting 75% of the time and suitable for standing 85% of the time for Configuration A. While these percentages become lower in Configuration B (65% and 80%, respectively), the summer wind conditions for both configurations are considered to be in the same category, i.e., comfortable for standing. The winter wind conditions for Configuration B are rated uncomfortable, since the 80% criterion is not satisfied for walking. Design measures to reduce wind speeds may be needed if the comfort designation is uncomfortable, or if the wind conditions are not consistent with the intended use of an area.

Safety is also considered by the criteria. Gust speeds equal to or in excess of 88 km/h can adversely affect a pedestrian's balance and footing. If winds of this magnitude occur more than two times per season, a "FAIL" RATING is indicated in the "SAFETY CATEGORY" section. Location 999 for Configuration B in the Example Table fails the safety criterion in the winter. Wind control measures are typically required at locations that receive the "FAIL" RATING.

These guidelines for wind force represent average wind tolerance. Regional differences in wind climate and variations in age, health, clothing, etc. can affect people's perception of the wind climate. Thermal effects, which as noted are not considered, also influence a person's comfort. For example, on very hot days, higher winds can be tolerated because the cooling effect of the wind would be considered pleasant. On colder days, people's tolerance of wind would be reduced due to wind chill, especially if they are unprepared or without appropriate clothing.

These criteria, developed by RWDI through research and consulting practice since 1974, have been published in numerous academic journals and conference proceedings (References 1 through 6 in Section 7). They have also been widely accepted by municipal authorities as well as by the building design and city planning community. RWDI's criteria have in the past been extensively used by several major cities around the world to supplement their environmental planning guidelines.

5. TEST RESULTS

Table 1, located in the Tables section of this report, presents the wind comfort and safety results for the summer and winter seasons, for the configurations tested. The results at each wind measurement location are graphically depicted on a site plan in Figures 3a through 4b. All of the measurement locations passed the safety criterion. The following is a detailed discussion of the suitability of the predicted wind conditions for the anticipated pedestrian use of each area.

5.1 Hotel Pedestrian Areas at Grade (Locations 1 through 19)

At walkways or parking lots, wind conditions suitable for walking are considered appropriate. Near entrances or drop-off areas, where pedestrians are more apt to linger, wind conditions comfortable for standing are preferred.

In the Existing Configuration, wind conditions around the project site were generally suitable for walking or better throughout the year (Figures 3a and 4a). Overall, wind conditions are considered to be suitable for the intended usage of the existing site.

With the addition of the proposed Hotel and Apartment building, wind conditions remained similar throughout the year (Figures 3b and 4b). At the main entrances (Locations 1, 5, and 7) wind conditions were appropriate for sitting in the summer and standing in the winter. On the surrounding sidewalks and in the parking lot, wind conditions were conducive to standing or sitting in the summer, while in the winter slightly higher wind speeds were observed, as wind conditions were suitable for standing or walking. These wind conditions are considered appropriate for the intended usage of the areas.

Wind conditions suitable for walking were observed at the key-card access door (Location 14) and at the retail entrances (Locations 10 and 11) in the winter (Figure 4b). If lower winds speeds are desired at these entrances the design team could consider including vestibules or recessed entrances, to provide more protection from prevailing winds.

5.2 Pedestrian Areas around Apartment Building (Locations 20 through 28, 59 and 60)

In the Existing Configuration, wind conditions were suitable for walking or better through the year (Figures 3a and 4a). These wind conditions are generally considered to be appropriate.

With the addition of the proposed Apartment building, on-site wind conditions remained comfortable for walking or better throughout the year (Figures 3b and 4b). These wind conditions are considered appropriate for the intended usage at most locations, including the roof-top parking area. For instance, at the main café, and restaurant entrances (Locations 23, 24 and 25) wind conditions were suitable for sitting or standing in the summer, which is consider appropriate. Wind speeds in the winter were slightly higher than desired, as these areas were considered comfortable for walking.

Winds at Locations 23 through 25 were caused by the predominant north-westerly winds in the winter. These winds accelerated along Brunswick Street, between the buildings; this is referred to as a Channelling Effect (see Image 1), and although it contributes to stronger winds in the area of the proposed Apartment building, wind conditions in the area were similar to the existing conditions.

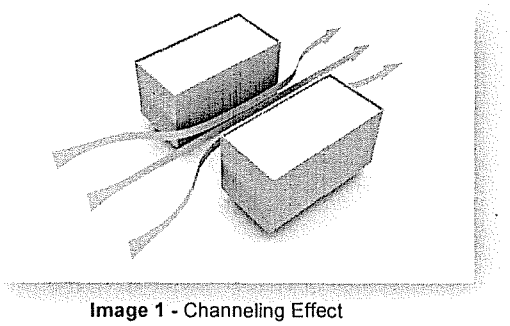

Image 1 - Channeling Effect

To improve wind conditions in these areas, the architects have included interior vestibules and recessed entrances (approximately 1.5m recess). While the recess is not significant enough to provide ample shelter from the winter winds, the inclusion of a

vestibule is a positive design feature. To further improve wind comfort conditions at these entrances, we recommend that the architects consider extending the depth of the recesses; 2 to 3m would be preferred.

5.3 Off-Site Pedestrian Areas (Locations 29 through 55)

Along sidewalks, wind conditions suitable for walking are considered appropriate.

In both the Existing and Proposed Configurations, wind conditions along Brunswick, Cogswell and Gottingen Streets, as well as Rainnie Drive, were suitable for walking or better in both the summer and winter seasons. These wind conditions are considered appropriate for the expected usage.

5.4 Hotel Terraces (Locations 56 through 58)

Ideally, sitting conditions are desired for terraces in the summer. During the summer, wind conditions on the upper terrace (Location 58) were comfortable for sitting, whereas wind conditions on the lower podium terrace (Locations 56 and 57) were comfortable for standing (Figure 3b). These wind speeds were due to south-westerly winds channelling between the two hotel towers (see Image 1). We understand the lower terrace will be a green roof and will include some landscaping, which along with the canopy/trellis feature extending between the towers is a positive feature that will help to shelter the area. However, if lower wind speeds are desired, we suggest including wind screens (at least 70% closed) or dense landscaping (minimum 2.5m in height) along the entire west edge of the podium (see examples in Images 2a and 2b).

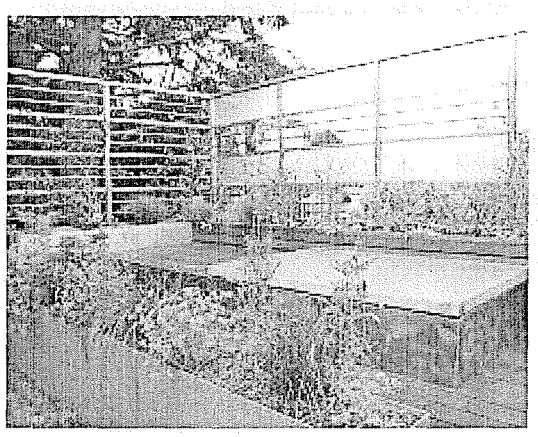

Image 2 - Glass Parapet or Wind Screen

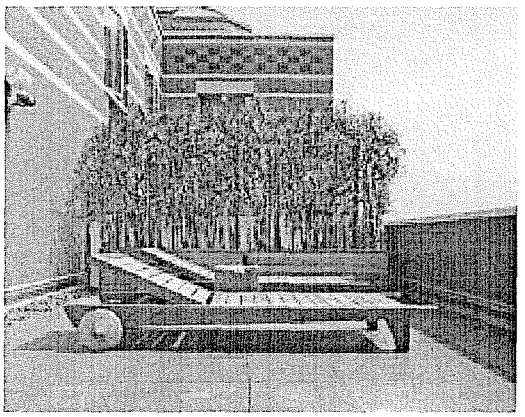

Image 3 - Landscaping

During the winter, wind conditions on both the high and low terraces are suitable for walking (Figure 4b), which is windier than typically desired for a terrace. However, based on discussions with the architect these areas would not be used frequently during the winter and the increased wind activity would be considered appropriate.

6. APPLICABILITY OF RESULTS

The results presented in this report pertain to the model of the proposed Citadel Hotel Redevelopment which was constructed using the architectural design drawings listed in Appendix A. Should there be any design changes that deviate from this list of drawings, the results presented may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

7. REFERENCES

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4) Soligo, M.J., Irwin, P.A., and Williams, C.J. (1993). "Pedestrian Comfort Including Wind and Thermal Effects," *Third Asia-Pacific Symposium on Wind Engineering*, Hong Kong.

5) Soligo, M.J., Irwin, P.A., Williams, C.J. and Schuyler, G.D. (1998). "A Comprehensive Assessment of Pedestrian Comfort Including Thermal Effects," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.77&78, pp.753-766.

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8) Durgin, F. H. (1997). "Pedestrian Level Wind Criteria Using the Equivalent average", *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 66, pp. 215-22

TABLES

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		SAFETY CATEGORY	
GEM Wind Speed (km/h)			0 - 10	0 - 14	0 - 19	>19		Gust Speed ≥88 (km/h)	
Category Limit			≥80%	≥80%	≥80%	>20%		> 2 Events Seasonally	
Loc.	Config.	Season	%	%	%	%	RATING	Events	RATING
1	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	90	95	100	0	Sitting	0	PASS
		Winter	70	90	95	5	Standing	0	PASS
2	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
	B	Summer	90	95	100	0	Sitting	0	PASS
		Winter	70	85	95	5	Standing	0	PASS
3	A	Summer	90	95	100	0	Sitting	0	PASS
		Winter	75	90	100	0	Standing	0	PASS
	B	Summer	90	100	100	0	Sitting	0	PASS
		Winter	75	90	100	0	Standing	0	PASS
4	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	85	95	100	0	Sitting	0	PASS
		Winter	70	90	95	5	Standing	0	PASS
5	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	85	95	100	0	Sitting	0	PASS
		Winter	75	90	95	5	Standing	0	PASS
6	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	70	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
7	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	85	95	95	5	Sitting	0	PASS
		Winter	70	85	95	5	Standing	0	PASS
8	A	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	80	90	10	Standing	0	PASS
	B	Summer	85	95	100	0	Sitting	0	PASS
		Winter	65	80	95	5	Standing	0	PASS
9	A	Summer	75	90	100	0	Standing	0	PASS
		Winter	60	80	90	10	Standing	0	PASS
	B	Summer	80	90	95	5	Sitting	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
10	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	70	85	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	1	PASS

Configuration A - Existing
Configuration B - Proposed

Summer: May - October
Winter: November - April

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**	
GEM Wind Speed (km/h)			0 - 10	0 - 14	0 - 19	>19		Gust Speed ≥88 (km/h)	
Category Limit			≥80%	≥80%	≥80%	>20%		> 2 Events Seasonally	
Loc.	Config.	Season	%	%	%	%	RATING	Events	RATING
11	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	85	95	5	Standing	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	70	85	15	Walking	0	PASS
12	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	90	10	Standing	0	PASS
13	A	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	80	90	10	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
14	A	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	80	90	10	Standing	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
15	A	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	80	95	5	Standing	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
16	A	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	80	90	10	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
17	A	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
	B	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
18	A	Summer	85	95	100	0	Sitting	0	PASS
		Winter	60	80	90	10	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
19	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	85	95	95	5	Sitting	0	PASS
		Winter	65	80	90	10	Standing	0	PASS
20	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	80	90	95	5	Sitting	0	PASS
		Winter	60	75	90	10	Walking	1	PASS

Configuration A - Existing
Configuration B - Proposed

Summer: May - October
Winter: November - April

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**	
GEM Wind Speed (km/h)			0 - 10	0 - 14	0 - 19	>19		Gust Speed ≥88 (km/h)	
Category Limit			≥80%	≥80%	≥80%	>20%		> 2 Events Seasonally	
Loc.	Config.	Season	%	%	%	%	RATING	Events	RATING
21	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	80	90	95	5	Sitting	0	PASS
		Winter	60	80	90	10	Standing	0	PASS
22	A	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	85	15	Walking	0	PASS
	B	Summer	70	85	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	0	PASS
23	A	Summer	70	85	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	0	PASS
	B	Summer	70	85	95	5	Standing	0	PASS
		Winter	45	65	80	20	Walking	1	PASS
24	A	Summer	70	85	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	0	PASS
	B	Summer	80	90	95	5	Sitting	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
25	A	Summer	75	90	95	5	Standing	0	PASS
		Winter	50	75	90	10	Walking	0	PASS
	B	Summer	70	85	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
26	A	Summer	75	90	95	5	Standing	0	PASS
		Winter	50	70	90	10	Walking	0	PASS
	B	Summer	65	85	95	5	Standing	0	PASS
		Winter	45	65	80	20	Walking	0	PASS
27	A	Summer	65	85	95	5	Standing	0	PASS
		Winter	45	70	85	15	Walking	1	PASS
	B	Summer	65	80	95	5	Standing	0	PASS
		Winter	45	60	80	20	Walking	0	PASS
28	A	Summer	80	90	100	0	Sitting	0	PASS
		Winter	60	80	90	10	Standing	0	PASS
	B	Summer	85	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
29	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	90	10	Standing	0	PASS
30	A	Summer	75	90	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	0	PASS
	B	Summer	80	90	100	0	Sitting	0	PASS
		Winter	55	75	90	10	Walking	0	PASS

Configuration A - Existing
Configuration B - Proposed

Summer: May - October
Winter: November - April

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**	
GEM Wind Speed (km/h)			0 - 10	0 - 14	0 - 19	>19		Gust Speed ≥88 (km/h)	
Category Limit			≥80%	≥80%	≥80%	>20%		> 2 Events Seasonally	
Loc.	Config.	Season	%	%	%	%	RATING	Events	RATING
31	A	Summer	80	90	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
32	A	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
33	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
34	A	Summer	85	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
	B	Summer	85	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
35	A	Summer	80	90	100	0	Sitting	0	PASS
		Winter	60	80	90	10	Standing	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
36	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	75	90	100	0	Standing	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
37	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
38	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
39	A	Summer	85	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
	B	Summer	85	95	100	0	Sitting	0	PASS
		Winter	70	90	95	5	Standing	0	PASS
40	A	Summer	85	95	100	0	Sitting	0	PASS
		Winter	70	90	95	5	Standing	0	PASS
	B	Summer	85	95	100	0	Sitting	0	PASS
		Winter	70	85	95	5	Standing	0	PASS

Configuration A - Existing
Configuration B - Proposed

Summer: May - October
Winter: November - April

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		SAFETY CATEGORY	
GEM Wind Speed (km/h)			0 - 10	0 - 14	0 - 19	>19		Gust Speed ≥88 (km/h)	
Category Limit			≥80%	≥80%	≥80%	>20%		> 2 Events Seasonally	
Loc.	Config.	Season	%	%	%	%	RATING	Events	RATING
41	A	Summer	90	95	100	0	Sitting	0	PASS
		Winter	80	90	100	0	Sitting	0	PASS
	B	Summer	95	100	100	0	Sitting	0	PASS
		Winter	85	95	100	0	Sitting	0	PASS
42	A	Summer	70	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
43	A	Summer	80	90	100	0	Sitting	0	PASS
		Winter	60	75	90	10	Walking	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	0	PASS
44	A	Summer	70	90	95	5	Standing	0	PASS
		Winter	50	70	90	10	Walking	0	PASS
	B	Summer	70	85	95	5	Standing	0	PASS
		Winter	45	70	85	15	Walking	0	PASS
45	A	Summer	70	90	95	5	Standing	0	PASS
		Winter	50	70	85	15	Walking	0	PASS
	B	Summer	65	80	95	5	Standing	0	PASS
		Winter	45	60	80	20	Walking	1	PASS
46	A	Summer	65	85	95	5	Standing	0	PASS
		Winter	45	70	85	15	Walking	0	PASS
	B	Summer	70	90	95	5	Standing	0	PASS
		Winter	50	75	90	10	Walking	0	PASS
47	A	Summer	70	90	95	5	Standing	0	PASS
		Winter	50	70	90	10	Walking	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
48	A	Summer	70	90	95	5	Standing	0	PASS
		Winter	50	75	90	10	Walking	0	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
49	A	Summer	75	90	95	5	Standing	0	PASS
		Winter	50	75	90	10	Walking	1	PASS
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
50	A	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	80	90	10	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS

Configuration A - Existing
Configuration B - Proposed

Summer: May - October
Winter: November - April

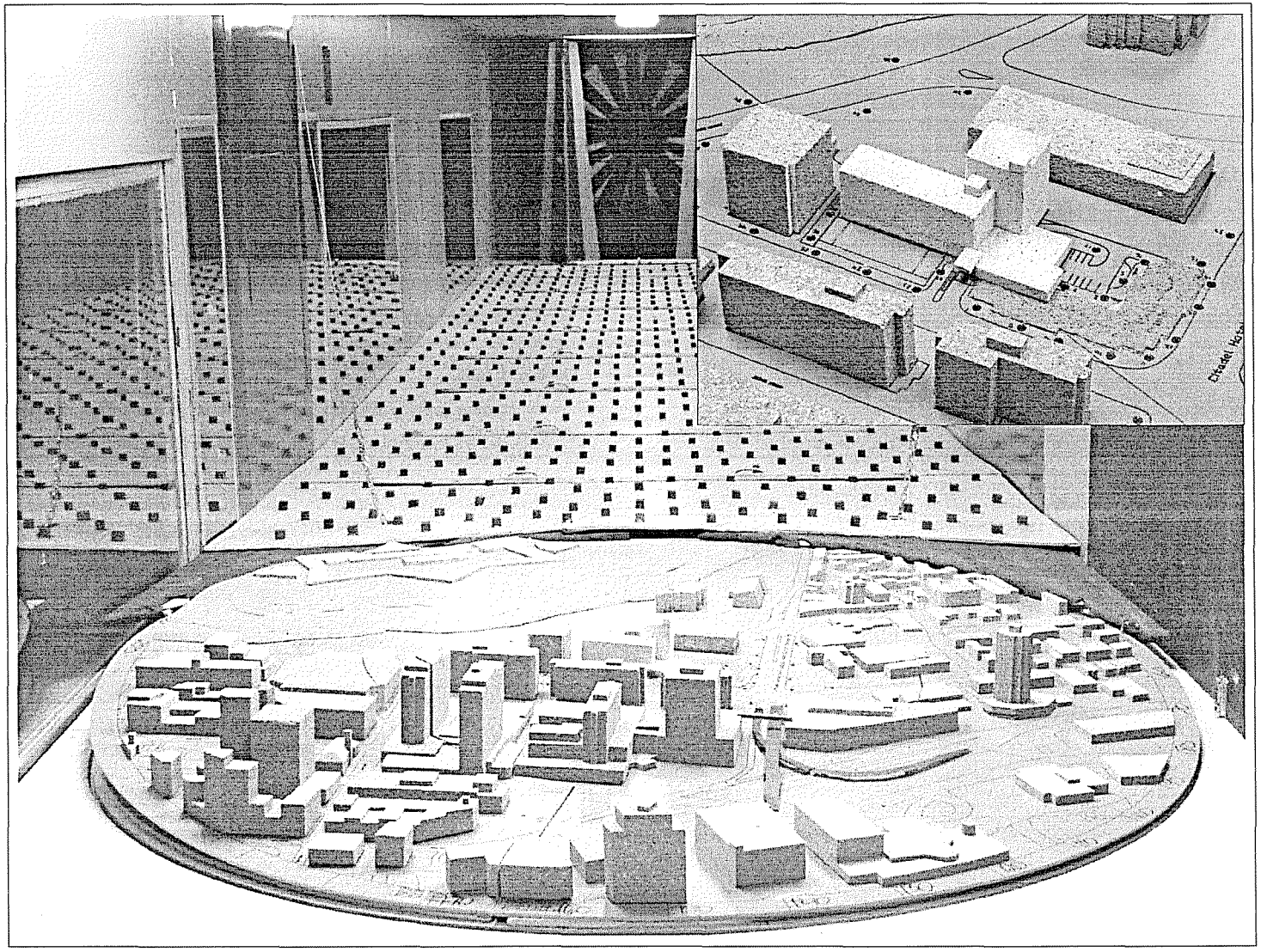
Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		SAFETY CATEGORY	
GEM Wind Speed (km/h)			0 - 10	0 - 14	0 - 19	>19		Gust Speed ≥88 (km/h)	
Category Limit			≥80%	≥80%	≥80%	>20%		> 2 Events Seasonally	
Loc.	Config.	Season	%	%	%	%	RATING	Events	RATING
51	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	95	5	Standing	0	PASS
52	A	Summer	85	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
	B	Summer	85	95	100	0	Sitting	0	PASS
		Winter	65	85	95	5	Standing	0	PASS
53	A	Summer	80	90	100	0	Sitting	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
	B	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
54	A	Summer	80	95	100	0	Sitting	0	PASS
		Winter	60	80	90	10	Standing	0	PASS
	B	Summer	75	90	100	0	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
55	A	Summer	80	90	100	0	Sitting	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
	B	Summer	80	95	100	0	Sitting	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
56	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	65	80	95	5	Standing	0	PASS
		Winter	45	65	80	20	Walking	2	PASS
57	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	65	85	95	5	Standing	0	PASS
		Winter	45	65	85	15	Walking	0	PASS
58	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	80	90	95	5	Sitting	0	PASS
		Winter	55	75	85	15	Walking	0	PASS
59	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS
60	A	Summer	DATA NOT AVAILABLE						
		Winter	DATA NOT AVAILABLE						
	B	Summer	75	90	95	5	Standing	0	PASS
		Winter	55	75	90	10	Walking	0	PASS

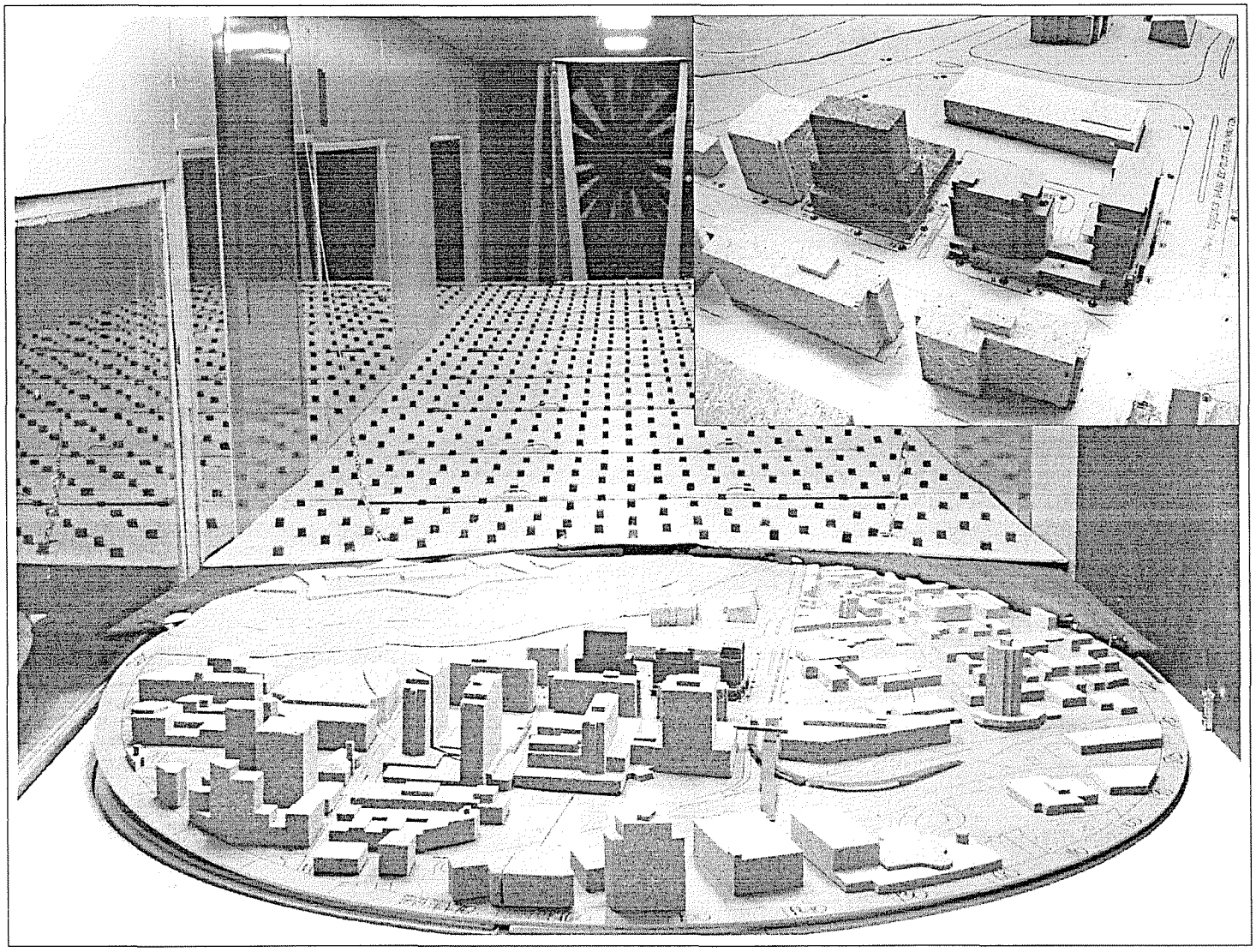
Configuration A - Existing
Configuration B - Proposed

Summer: May - October
Winter: November - April

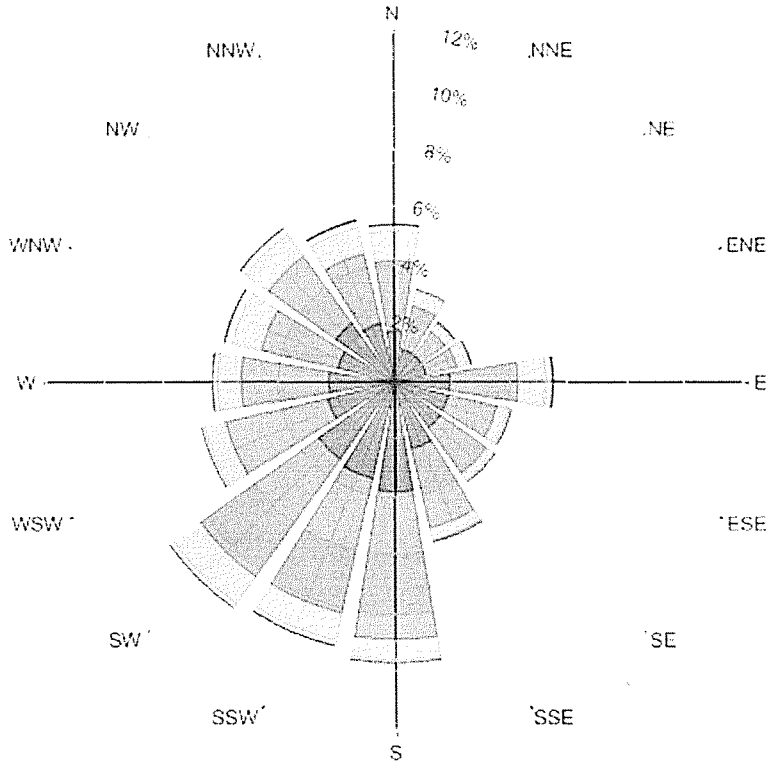
FIGURES



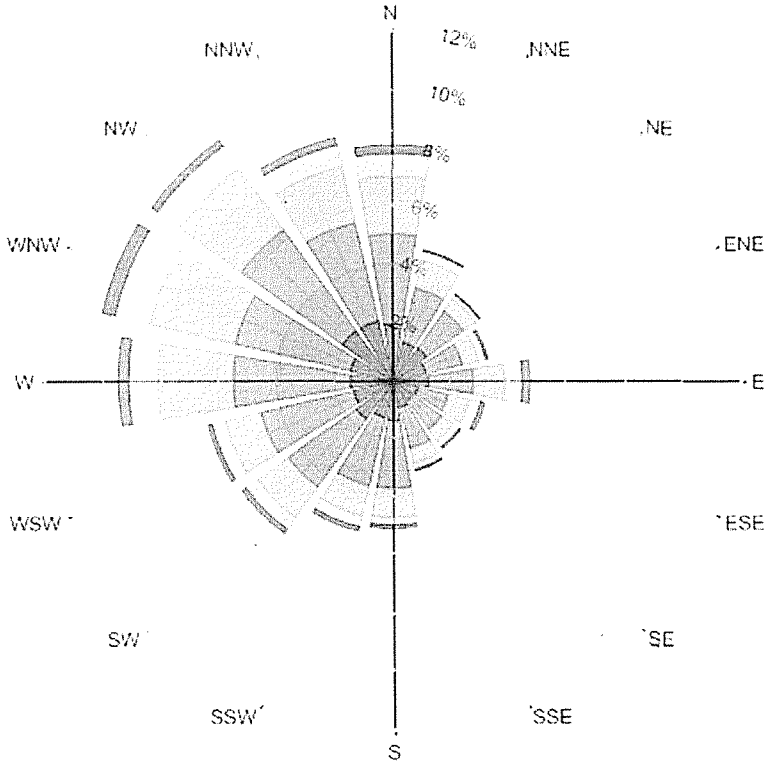
Wind Tunnel Study Model **Existing Configuration** Citadel Hotel Redevelopment - Halifax, Nova Scotia Project #1102163	Figure: 1a Date: October 25, 2011	RWDI



Wind Tunnel Study Model **Proposed Configuration** Citadel Hotel Redevelopment - Halifax, Nova Scotia Project #1102163	Figure: 1b Date: October 25, 2011	RWDI



Summer Winds
(May - October)



Winter Winds
(November - April)

Speed (km/h)	Probability (%) Summer	Winter
Calm	6.3	3.9
1-10	35.1	22.8
11-20	44.4	39.9
21-30	11.6	21.7
31-40	2.2	8.3
>40	0.4	3.3

Directional Distribution (%) of Winds (Blowing From)
Shearwater Airport (1980 - 2009)

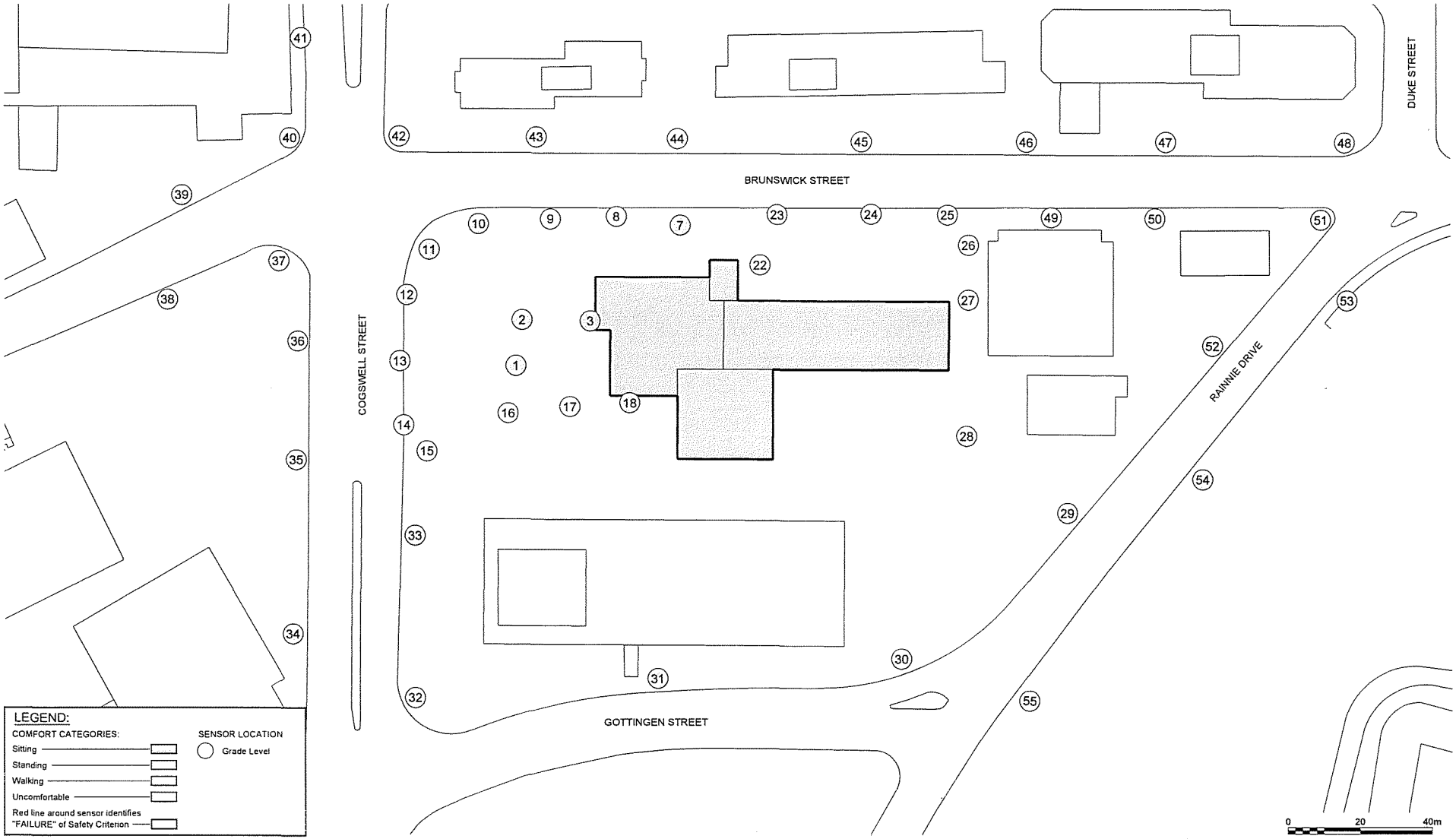
Citadel Hotel Redevelopment – Halifax, Nova Scotia

Project # 1102163

Figure No: 2

Date: 10/27/2011

RWDI



Pedestrian Wind Conditions - Existing
Summer (May to October)

True North

Drawn by: GDA | Figure: 3a

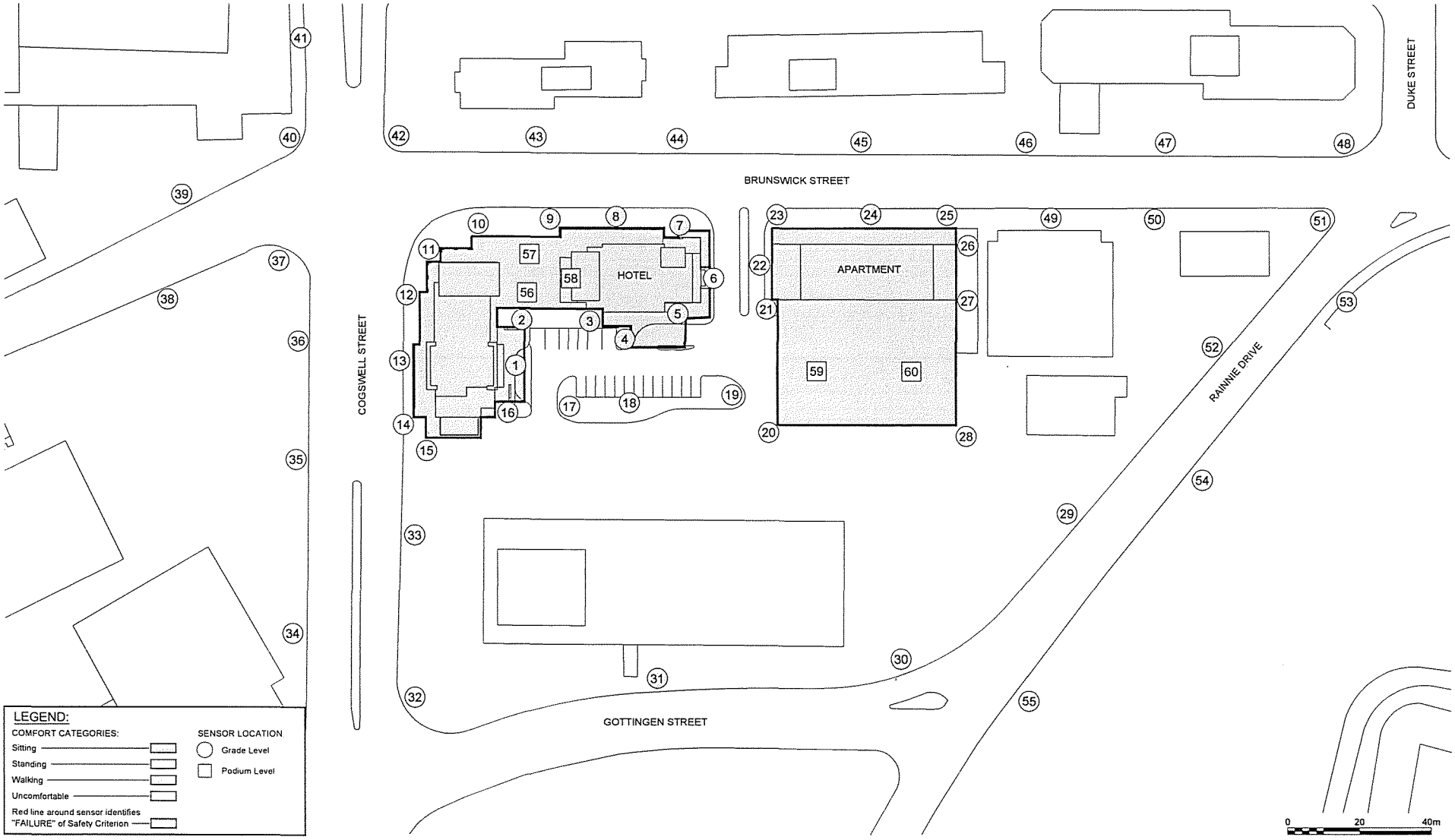
Approx. Scale: 1:1000

Date Revised: Oct. 25, 2011

Citadel Hotel Redevelopment - Halifax, Nova Scotia

Project #1102163

RWDI



Pedestrian Wind Conditions - Proposed
Summer (May to October)

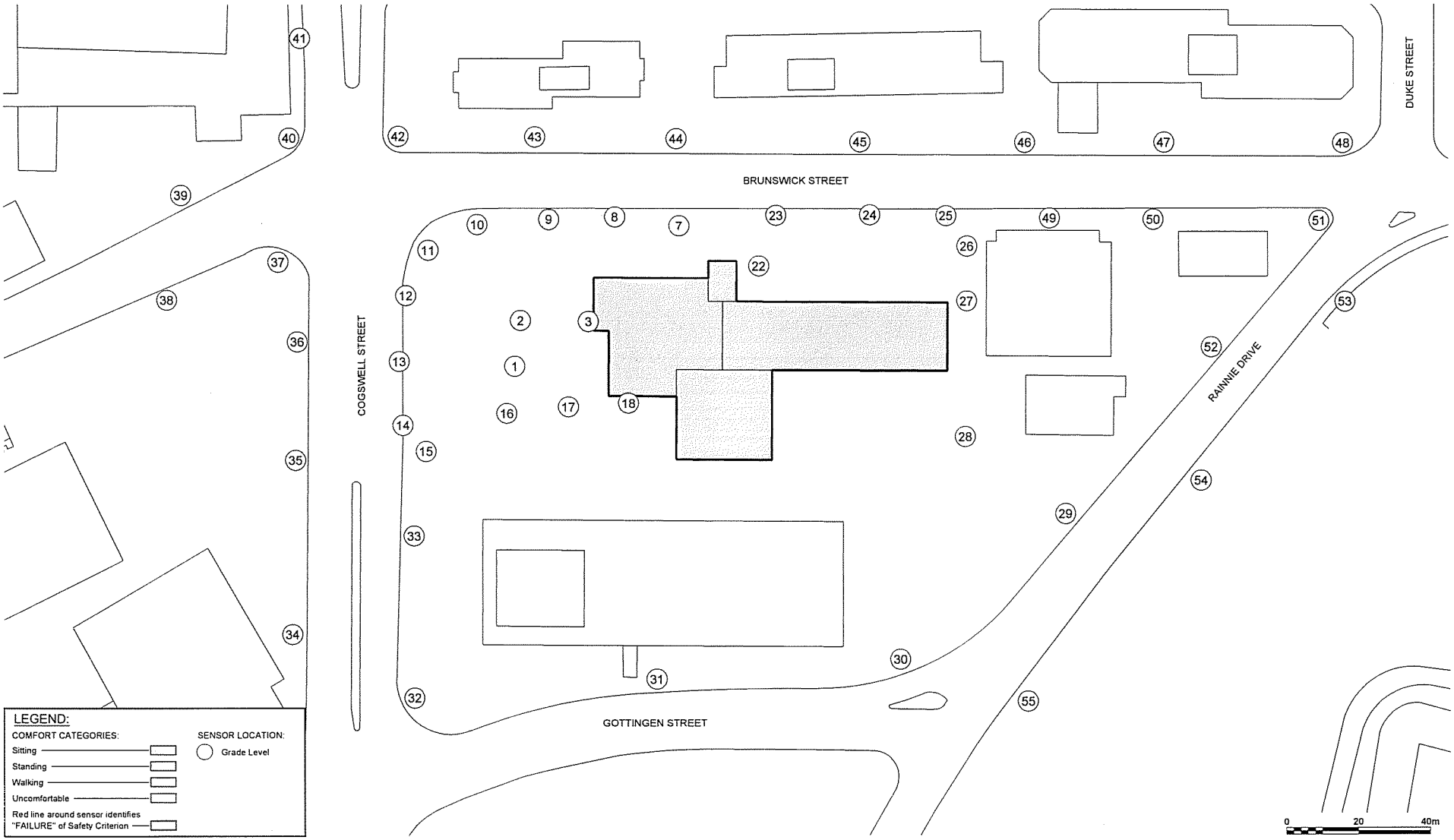
True North

Drawn by: GDA | Figure: 3b
Approx. Scale: 1:1000
Date Revised: Oct. 25, 2011

Citadel Hotel Redevelopment - Halifax, Nova Scotia

Project #1102163

RWDI



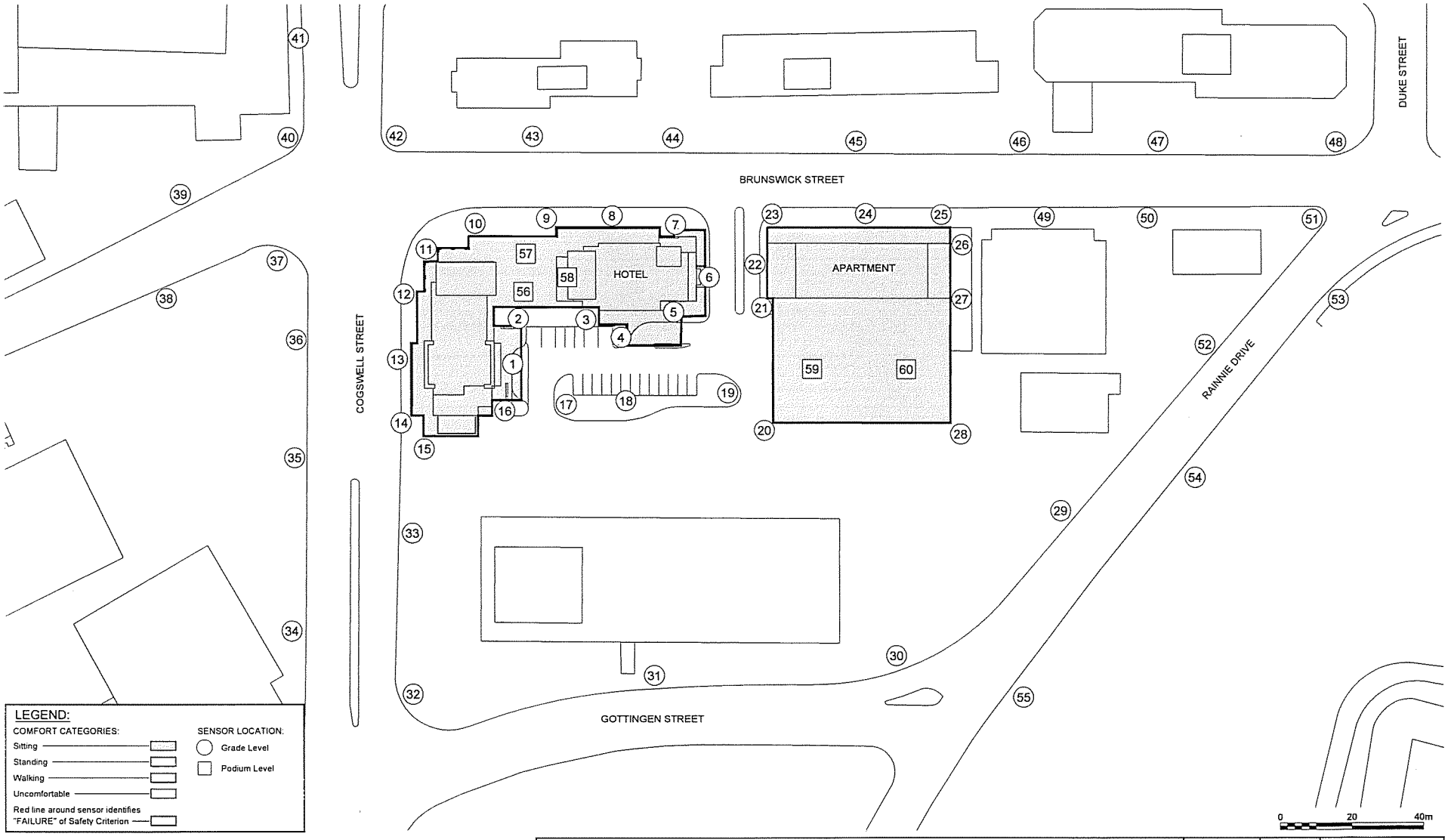
Pedestrian Wind Conditions - Existing
Winter (November to April)

True North

Drawn by: GDA | Figure: 4a
Approx. Scale: 1:1000
Date Revised: Oct. 25, 2011

Citadel Hotel Redevelopment - Halifax, Nova Scotia
Project #1102163

RWDI



Pedestrian Wind Conditions - Proposed
Winter (November to April)

True North

Drawn by: GDA | Figure: 4b
Approx. Scale: 1:1000
Date Revised: Oct. 25, 2011

RWDI

Citadel Hotel Redevelopment - Halifax, Nova Scotia

Project #1102163

APPENDIX A

APPENDIX A: DRAWING LIST FOR MODEL CONSTRUCTION

The drawings and information listed below were received from Chamberlain Architect Services Limited were used to construct the scale model of the proposed Citadel Hotel Redevelopment. Should there be any design changes that deviate from this list of drawings, the results may change. Therefore, if changes in the design area made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

File Name	File Type	Date Received (dd/mm/yyyy)
110038 - Halifax - Citadel.rvt	Revit	28/09/11
30778-Cogswell-Progress Drawing-Sep 27 2011	PDF	28/09/11