DRAFT

HALIFAX, NOVA SCOTIA

QE II REDEVELOPMENT PROJECT
MASTER PLANNING REPORT

PROGRESS: JULY 17, 2017

VOL. 01

DRAFT

Prepared for
Department of Transportation & Infrastructure Renewal (DTIR)
Johnson Building
1672 Granville St.
Halifax, Nova Scotia
www.novascotia.ca/tran/

Prepared by
KASIAN Architecture Ontario Inc.
85 Hanna Avenue, Suite 300
Toronto, Ontario
www.kasian.com

Consultants
Kasian Architecture Ontario Inc., Prime Consultant
Agnew Peckham, Master Programmer
F.C. O'Neill, Scriven & Associates Ltd., Mechanical, Electrical & IT Engineering
BMR Structural Engineering, Structural Engineering
Vollick McKee Petersmann & Associates Ltd., Landscape
Leading Edge Group, Lean
CM Group Inc., Health Informatics Analysts
Insight Health Tech Planning, Equipment Planner
WSP Global, Civil Engineering
Hanscomb Ltd., Cost
Davis Pier Consulting, Health Informatics
LRI Engineering Inc., Code
BA Consulting Group Ltd., Traffic
Sharon Vanderkaay, Common Ground Workshop Facilitator
National, Public Relations

Project Team

Kasian is the prime consultant retained by DTIR to complete the Master Programming, Functional Programming and Master Planning Project for the QEII Redevelopment Project. Kasian is collaborating with the following consultant team to develop a comprehensive master programming and planning report that will guide future developments at the Halifax Infirmary (HI) and Victoria General (VG) sites.

Prime Consultant:

KASIAN ARCHITECTURE ONTARIO INCORPORATED

85 Hanna Avenue, Suite 300
Toronto, Ontario
Canada, M6K 3S3

Master Programmer:

AGNEWPECKHAM
HEALTH CARE & FACILITY PLANNERS

AGNEW PECKHAM HEALTH CARE PLANNING CONSULTANTS

4141 Yonge St
North York, Ontario
Canada, M2P 2A8

M + E + IT Engineer:

F.C. O'Neill, Scriven & Assoc's Limited Consulting Engineers

F.C. O'NEILL, SCRIVEN & ASSOC'S LIMITED

5450 Cornwallis Street
Halifax, Nova Scotia
Canada B3K 1A9

Structural Engineer:

BMR Structural Engineering

BMR STRUCTURAL ENGINEERING

5413 Doyle St
Halifax, Nova Scotia
Canada, B3J 1H9

Landscape Consultant:

Vollick McKee Petersmann

VOLLICK MCKEE PETERSMANN & ASSOCIATES LIMITED

3008 Oxford Street, Suite 203
Halifax Nova Scotia
Canada B3L 2W5

Lean Consultant:

LEADINGEDGE GROUP

LEADING EDGE GROUP

60 St. Clair Avenue East, Suite 805
Toronto, Ontario
Canada, M4T 1N5

DRAFT

Project Team

Public Relations:

N|A|T|I|O|N|A|L
Trusted Partner. Bold Thinking.™

Health Informatics Analysts:

CM GROUP INC.

2578 Ambercroft Trail
Mississauga, Ontario
Canada, L5M 4K4

Cost Consultant:

HANSCOMB LIMITED

40 Holly St
Toronto, Ontario
Canada, M4S 3C3

Civil Engineer:

WSP GLOBAL

150 - 36 Solutions Drive
Halifax, Nova Scotia
Canada, B3S 1N2

Traffic Consultant:

BA CONSULTING GROUP LTD

45 St Clair Ave W
Toronto, Ontario
Canada, M4V 1K9

Equipment Planner:

INSIGHT HEALTH TECH PLANNING

1285 Eglinton Ave East., Unit 19
Mississauga, Ontario
Canada, L4W 1B9

Health Informatics:

DAVIS PIER CONSULTING

1496 Lower Water St #420
Halifax, Nova Scotia
Canada, B3J 1R9

Code Consultant:

LRI ENGINEERING INC.

170 University Ave, 3rd Floor
Toronto, Ontario
Canada, M5H 3B3

Common Ground Workshop Facilitator:

Sharon Vanderkaay

DRAFT

Acknowledgements

The design team would like to acknowledge the time, input and effort from DTIR & NSHA in delivering the master programming/ planning project. Extensive input was provided by a broad spectrum of stakeholders including; physicians and other clinicians, ancillary service providers, support services staff, the project management office, members of the executive team, the Board of the NSHA and officials and politicians from a variety of related government departments. This degree of consultation with both internal and external stakeholders will help to ensure that this master program and master plan for the long term redevelopment of the Halifax Infirmary and Victoria General Hospital sites that will enable the QEII HSC to achieve its clinical and community objectives; delivering Connected Care for all Nova Scotians.

The Master Programming/ Master Planning document is a result of a highly collaborative effort between many different participants. The Design & Programming team would like to thank the following for their contributions & efforts:

QEII Project Team

Karen Mumford, Sr. Director - QEII/ DGH Redevelopment, NSHA
Victoria VanHemert, Sr. Director - QEII/ DGH Redevelopment, NSHA
Janice Johnston, Director- Infrastructure, QEII Redevelopment, NSHA
Gerry Giffin, Project Manager, QEII Redevelopment, NSHA
Bill Levangie, Manager - Engineering & Facility Planning, NSHA
Bob Borden, Manager - Construction Services & Engineering, NSHA
Jim MacLean, IM/IT Manager, QEII Redevelopment, NSHA
Terry Smith-Lamothe, Sr. Architect - DTIR
Brian Ward, Director of Major Infrastructure, DTIR
Nicole Degier, Communications & Public Relations NSHA
Rita Morrison, Clinical Director NSHA
Jessica Simms, Executive Assistant to Senior Director QEII/DGH Redevelopment

QEII Facility Renewal Executive Committee

Paula Bond, VP Sponsor- Integrated Health Services Program Care, NSHA
Allan Horsburgh, VP Sponsor- Stewardship & Accountability and Chief Financial Officer, NSHA
Dr. David Kirkpatrick, Department Head of Surgery, NSHA (Co-Lead)
John O'Connor, Executive Director - Major Infrastructure Projects, DTIR
Karen Mumford, Sr. Director- QEII/ DGH Redevelopment, NSHA (Co-Lead)
Janice Johnston, Director- Infrastructure, QEII Redevelopment
Bill Levangie, Manager - Engineering & Facility Planning, NSHA
Bob Borden, Manager - Construction Services & Engineering, NSHA
Jim MacLean, IM/IT Manager, QEII Redevelopment, NSHA
Gerry Giffin, Project Manager, QEII Redevelopment, NSHA
Brian Ward, Director of Major Infrastructure, DTIR
Terry Smith-Lamothe, Sr. Architect - DTIR
Bryan Darrell, Director- Infrastructure Management, DTIR

Steering Committee

Dr. David Kirkpatrick (co-chair)
Karen Mumford (co-chair)
Dr. David Bell
Roberta Baker
Dr. James Bentley
Bob Borden
Brian Butt
Dave Collins
Dr. Steven Couban
Bryan Darrell
Dr. Chad Robertson
Nicole DeGier
Joanne Dunnington
Gerry Giffin
Denis Gillis
Debbie Hutchings
Dr. Simon Jackson
Janice Johnston
Bob Kolanko
Dr. Adam Law
Bill Levangie
Jim MacLean
Karen McDuff
Randi Monroe
Kim Munroe
Dr. Marcello Nicolela
Sherri Parker
Tobias Witter
Denis Pellichero
Shannon Ryan Carson
Dr. Romesh Shukla
Vickie Sullivan
Dr. Mark Taylor
Victoria Van Hemert

Staff Representatives, Halifax Regional Municipality (HRM)

Richard Harvey, Manager - Policy & Planning, Parks & Recreation
Mitch Dickey, Policy Coordinator, Parks & Recreation
Carolle Koziak Roberts, Landscape Architect, Policy & Planning, Parks & Recreation
Tanya Davis, Manager- Strategic Transportation Planning Program
Peter Duncan, Manager- Infrastructure Planning
Patricia Hughes, Manager- Halifax Transit

Extensive consultation took place with the following user groups in the development of the master program and master plan:

- Ambulatory Care
- Critical Care
- Medical/ Surgical Inpatient Units
- Perioperative Services
- Diagnostic Imaging
- Laboratory Services
- Pharmacy
- Research and Learning
- Administrative Services
- Emergency
- Support Services
- Cancer Care

Table of Contents

VOL. 01 Master Planning Research Report

Note: Master Program and Functional Programs are under a separate volume. Submitted separately to DTIR & NSHA.

DRAFT

Table of Contents

VOL. 02 Preferred Options Development (Submitted in a separate volume)

Notes:

Master Program and Functional Programs are under a separate volume. Submitted separately to DTIR & NSHA.

Cost Estimate is under a separate volume. To be submitted separately to DTIR &NSHA in January 2018.

KASIAN

List of Illustrations

List of Illustrations

Definitions & Abbreviations

BUILDING HEIGHT

Building Height is the vertical distance measured from grade to the roof level and excludes mechanical penthouses.

DEPARTMENTAL GROSS SQUARE FOOTAGE (DGSF)

Departmental Gross Area (Also referred to as component gross area) is the space required to house a whole department or functional area. It includes all the individual net areas required by the departmental functions, circulation space as necessary to link together the net spaces and area occupied by internal walls. It excludes all engineering spaces and interdepartmental circulation elements such as main corridors, stairways, elevators and dumbwaiters.

GROSS FLOOR AREA (GFA)

Gross floor area is the total of the horizontal areas of each floor of a building or structure, measured from the exterior face of the exterior walls or from the centerline of a common wall separating two buildings or structures, above the finished grade. The finished grade is the final level of the ground surface after grading.

NET SQUARE FOOTAGE (NSF)

Net Area is the usable space, usually comprising a single room or floor area, allocated to a function or group of related functions. It excludes the area occupied by walls, corridors and space for engineering installations including duct shafts and chases.

SITE COVERAGE

The portion of a building site that is occupied by any building or structure, typically expressed as a percentage of occupied footprint area to total site area.

SETBACKS

Setbacks are the distance from a property line within which building is prohibited. Setbacks are set in municipal ordinances or zoning by-laws.

GROSS TO NET RATIO

The Gross to Net Ratio is a factor which yields the departmental gross area when applied to a given net area or sum of net areas. Net to gross ratios are empirical and vary according to function and also by lesser amounts according to the individual programmer or designer applying them.

Background Documents

In order to fully understand all relevant historic & current issues, the team conducted a thorough evaluation of all documents provided. The following list of documents were reviewed by the design team as part of the master programming/ master planning process:

Rezoning
- *"Halifax Municipal Planning Strategy", November 26, 2016*
- *"Land use By-law - Halifax Peninsula", May 21, 2016*
- *"Peninsula Land Use By- Law, ZM-17 - Height Precincts", December 2014*
- *"City of Halifax - Halifax Common Background Report"*

MOU
"Signed MOU HRM_CDHA", Feb 12, 2010

Nova Scotia Health Authority
- *"Healthier Together - Introduction"*
- *"Healthier Together - Questions & Answers"*
- *"Healthier Together - 2016-19 Strategic Plan"*
- *"Healthier Together - Vision, Mission, Values"*
- *"Briefing Note: Physician and Academic - related Space Planning Principles applicable to QEII Redevelopment"*

Existing Reports
Abbie J. Lane
- *"Abbie J Lane Renovations DWG", March 24, 2016*

Ambulatory Care Documents - 2014
- *"AMB Care Clinical Service Planning Established And Opportunities"*
- *"Clinical Service Planning for District Ambulatory Care - Cancer Care"*
- *"Clinical Service Planning for District Ambulatory Care - Cardiac Surgery", May 2, 2014*
- *"Clinical Service Planning for District Ambulatory Care - Cardiology Clinic", May 2, 2014*
- *"Clinical Service Planning for District Ambulatory Care - Discussion Guide", Feb 25, 2014*
- *"Clinical Service Planning for District Ambulatory Care - ENT", July 11*
  "Clinical Service Planning for District Ambulatory Care - Gyne"
- *"Clinical Service Planning for District Ambulatory Care - Minor Procedures"*
- *"Clinical Service Planning for District Ambulatory Care - Nephrology Services"*
- *"Clinical Service Planning for District Ambulatory Care - Neurology"*
- *"Clinical Service Planning for District Ambulatory Care - Neurology - EEG - EMG"*
- *"Clinical Service Planning for District Ambulatory Care - Neurosurgery"*
- *"Clinical Service Planning for District Ambulatory Care - OMS"*
- *"Clinical Service Planning for District Ambulatory Care - Orthopaedics"*
  "Clinical Service Planning for District Ambulatory Care - Plastics"
- *"Clinical Service Planning for District Ambulatory Care - Pulmonary Function"*
- *"Clinical Service Planning for District Ambulatory Care - Respirology"*
- *"Clinical Service Planning for District Ambulatory Care - Respirology - CF Clinic"*
- *"Clinical Service Planning for District Ambulatory Care - Urology"*
- *"Clinical Service Planning for District Ambulatory Care - Vascular Lab and Clinic"*
- *"Clinical Service Planning for District Ambulatory Care - Vascular Lab - Clinic - MDLUC"*
- *"Clinical Service Planning for District Ambulatory Master"*

Ambulatory Care Documents - 2016
- *"Capital Health Cancer Care Program Functional Program", May 5, 2015*
- *"Ambulatory Care Clinical Services Planning", June 24, 2016*
- *"Central Zone Heart Health Program Service Inventory"*
- *"QEII Redevelopment Project - Community Outpatient Center - Conceptual Document", Sept 2, 2016*
- *"Cobequid Community Health Centre - Top 10 Clinics by % of Central Zone Residence"*
- *"Preya Workload at HIVH V2 - with forecasts", Oct 23, 2016*
- *"Provincial OP Visits by DHA"*
- *"QEII Redevelopment AC Foundational Study FINAL Publication"*

Bed Inventory
- *"Current Bed- Service Map with Capacity Potential Detail", Mar 1, 2017*

CHN Plan
- *"Community Clinical Services/Health System Planning Initiative Summary"*
- *"Community Health Network 1: Dartmouth/Southeastern"*
- *"Community Health Network 2: Halifax Peninsula/Chebucto"*
- *"Community Health Network 3: Bedford/Sackville"*
- *"Community Health Network 4: Eastern Shore Musquodoboit"*
- *"Community Health Network 5: West Hants"*
- *"Community Profile Glossary, Data Dictionary, & References"*

Dock Use
- *"Archibus FM Space Management Data: Camp Hill Campus"*
- *"Archibus FM Space Management Data: Site Plan Victoria Campus"*

Engagement Guide
- *"Involving Patients and Citizens in Decision Making: A Guide to Effective Engagement"*
- *"Patient and Public Engagement: A Supplementary Guide for Quality Improvement and Safety Teams"*
- *"Talk About Health: The Story"*

Environmental Reports
- *"Final Report: Geotechnical Investigation - Proposed Halifax Infirmary Emergency Dept. Addition", Mar 7, 2007*
- *"Phase I Environmental Site Assessment Draft", May 25, 2007*

Facilities Assessment Reports
- *"Abbie J. Lane Memorial Facility Evaluation", June 2008*
- *"Bethune Building Facility Evaluation", June 2008*
- *"Cenntennial Building Facility Evaluation", June 2008*
- *"Dickson Building Facility Evaluation", June 2008*
- *"MacKenzie Building Facility Evaluation", June 2008*
- *"Nova Scotia Rehabilitation Centre Building Facility Evaluation", June 2008*
- *"Veterans' Memorial Building Facility Evaluation", June 2008*
- *"Victoria Building Facility Evaluation", June 2008*
- *"West Annex Building Facility Evaluation", June 2008*

Former School Information
- *"Phase II Environmental Site Assessment", Oct 29, 2008*
- *Certificate of Analysis: 11X515735", Aug 10, 2011*

Hants
- *"1607 Hants OR Cost Estimate", Aug 24, 2016*
- *"1607 Coloured Plans", Aug 16, 2016*
- *"Nova Scotia Health Authority - Hants Community Hospital O.R. Assessment, Mechanical & Electrical Systems", Jul 6, 2016*
- *"OR#1 & Redevelopment - PACU Needs", Oct 14, 2016*
- *"Perioperative Services", Oct 14, 2016*
- *"Financial Summary - Option 1", Oct 14, 2016*

Other Reports
- *"Capital District Health Authority Facilities Master Plan", Jul 3, 2008*
- *"The Patient Journey Through Emergency Care in Nova Scotia", Oct 2010*
- *"Nova Scotia Health Profile 2015"*
- *"Revised Capital Health Demand Analysis Appendix 1", Mar 14, 2008*

Parking Data
- *"Average Parking Duration 2016"*
- *"QEII Nov 20 Movements", Feb 2, 2017*

Parking Data
- *"QEII Nov 20 Occupancy", Feb 2, 2017*
- *"QEII Nov 21 Movements", Feb 2, 2017*
- *"QEII Nov 21 Occupancy", Feb 2, 2017*
- *"QEII Nov 22 Movements", Feb 2, 2017*
- *"QEII Nov 22 Occupancy", Feb 2, 2017*
- *"QEII Nov 23 Movements", Feb 2, 2017*
- *"QEII Nov 23 Occupancy", Feb 2, 2017*
- *"QEII Nov 24 Movements", Feb 2, 2017*
- *"QEII Nov 24 Occupancy", Feb 2, 2017*
- *"QEII Nov 25 Movements", Feb 2, 2017*
- *"QEII Nov 26 Occupancy", Feb 2, 2017*
- *"QEII Staff Parking vs Visitors"*

Press Release
- *"QEII Redevelopment Plan to Better Connect Care for Nova Scotians" , Apr 21, 2016*
- *"Government, Health Authority Accept Auditor General Recommendations", June 8, 2016*
- *"Dartmouth General Hospital Renovation Reaches Another Milestone", June 24, 2016*
- *"Next Step Begins for Expansion at Dartmouth General Hospital", Jul 8, 2016*
- *"Request for Proposals for QEII Healthcare", Aug 4, 2016*
- *"Expansion at Dartmouth General Hospital Moving Forward", Oct 5, 2016*
- *"Dartmouth General Hospital Moves Toward Energy Efficient Addition", Nov 17, 2016*
- *"QEII Redevelopment Planning and Programming Begins", Nov 21, 2016*

Previous Master Plan Reports
- *"Capital District Health Authority Facilities Master Plan", Jul 3, 2008*
- *"Innovative Care Flexible Facilities Part A Report", Feb 22, 2013*
- *"Innovative Care Flexible Facilities Part B Report", Jun 25, 2013*
- *"Innovative Care Flexible Facilities Part F Report", May 22, 2015*

QEII Redevelopment Phase 1 Deliverables
- *"3rd Floor Acute Inpatient Unit Investigation", Oct 24, 2016*
- *"5th Floor, Critical Care / Intermediate Care Upgrades - Schematic Design Report", Nov 1, 2016*
- *"QEII 3rd Floor Diagnostic Imaging Interventional Suite Upgrades - Schematic Design Report", Nov 9, 2016*
- *"QEII 5th Floor Periop Upgrades - Schematic Design Report", Nov 9, 2016*
- *"QEII Redevelopment - Ambulatory Services Realignment", Nov 2016*

RFP Annex Documents
- *"Annex A - Summary of Schematic Design Reports by Nycum & Associates"*
- *"Annex B - Master Planning Concept"*
- *"Annex C - NSHA Central Zone Facilities Summary"*
- *"Annex D - Nova Scotia Detailed Health Statistical Information"*

Strategic Organization
- *"2016-17 Business Plan", May 12, 2016*
- *"Matrix Organization - Discussion Document", Sept 14, 2016*
- *"Why a Matrix Model"*
- *"Nova Scotia Health Authority Reporting Structure - Executive and Zone Leadership", Oct 18, 2016*
- *"Nova Scotia Health Authority Reporting Structure as of 12/05/16 - Sr. Director & CIO Information Management / Information Technology", Dec 5, 2016*
- *"VP Integrated Health Services - Community Support & Management", May 20, 2016*
- *"VP, Integrated Health Services Program 1", Sept 23, 2016*
- *"VP Integrated Health Services - Program Care 2", May 20, 2016*
- *"Nova Scotia Health Authority, Reporting Structure, VP Medicine and Integrated Heath Services", Dec 8, 2016*
- *"Vice President, People and Organizational Development", Aug 9, 2016*
- *"VP, Integrated Health Services - Primary Health Care & Population Health", May 11, 2016*
- *"Vice-President, Research, Innovation and Knowledge Translation", May 4, 2016*
- *"VP Stewardship and Accountability and Chief Financial Officer", Dec 7, 2016*
- *"Nova Scotia Health Authority QEII Senior Director Org Chart"*
- *"QEII Clinical Services Plan - "Guiding Principles"", Feb 24, 2016*
- *"Auditor General Report (May 2016) - QEII Redevelopment Response", Sept 2, 2016*

Strategic Plan
- *"Healthier Together: Introduction"*
- *"Healthier Together: Questions and Answers"*
- *"Healthier Together: 2016-19 Strategic Plan"*
- *"Vision, Mission, Values"*

Traffic
- *"Final Report Traffic Impact Study: St. Pat's / QEH School" , Jul 2005*
- *"Final Report Traffic Impact Study: St. Pat's / QEH School" , Jul 2005*
- *"Final Report Traffic Impact Study: St. Pat's / QEH School Appendices" , Jul 2005*

VG Site Tunnel
- *"VG Site - Underground Tunnel Connections / Interdependencies"*
- *"Victoria General Site Services"*

Executive Summary

Introduction

The QEII Health Sciences Centre (QEII HSC), one of only 17 academic health sciences networks in Canada, provides primary and secondary care services to people in the Central Zone catchment area, and specialized tertiary care- including heart surgery and cancer treatment- to residents from across Nova Scotia, New Brunswick and Prince Edward Island. Additionally, the QEII provides quaternary care services such as organ and stem cell transplantation to patients throughout Atlantic Canada. The QEII is situated on two sites located in downtown Halifax - Halifax Infirmary and Victoria General- situated within close, 4 block, walking distance of each other.

Project Intent

The purpose of this project is to develop a master program, a series of priority functional programs and master plan for the QEII Health Sciences Centre for the Halifax Infirmary (HI) and Victoria General (VG) sites as well as, a master program and master plan for the Community Outpatient Centre at Bayers Lake. The intent of the master program and master plan is to provide a long-term road map for development to provide “Connected Care for Nova Scotians” for the next 50 years, ensuring that the appropriate programs and services are provided in the right locations to achieve excellence in health, learning and research. A key driver for this project is to upgrade the facilities to meet the desired healthcare standard, which the current aging infrastructure become increasingly unable to accommodate.

Consultation

Extensive input was provided by a broad spectrum of stakeholders including; patients and families, physicians and other clinicians, ancillary service providers, support services staff, the project management office, members of the executive team, the Board of the NSHA and municipal officials and politicians from a variety of related local and Provincial government departments. This degree of consultation with both internal and external stakeholders will help to ensure that this master program and master plan for the long-term redevelopment of the Halifax Infirmary and Victoria General Hospital sites enables the QEII HSC to achieve its clinical and community objectives; delivering Connected Care for all Nova Scotians.

Methodology and Approach

The project planning scope consists of four major phases of work.

1. Project Launch/ Research
2. Master Program
3. Functional Program
4. Master Plan

Each phase being a highly collaborative effort, engaging NSHA QEII redevelopment team and staff in meaningful dialogue about creating appropriate solutions for development to improve access to and quality of health care for patients, to create healthy work environments for staff, and to expand on and better enable the cutting-edge research currently undertaken by NSHA.

Master Planning Key Drivers and Principles

The Master Plan is influenced by and reflects a variety of key drivers and guiding principles including the need to:

1. Reflect the values and vision of the hospital;
2. Maximize site utilization ,
3. Create a rational growth pattern,
4. Allow for flexibility, growth and change overtime,
5. Support a phased approach to redevelopment,
6. Enhance urban connectivity with the City and adjacent parks,
7. Improve wayfinding, internal circulation and access,
8. Support continuous clinical functionality at each phase,
9. Enhance the patient and visitor experience through healing environments with views to nature and ample natural light,
10. Reflect a philosophy of sustainability,
11. Optimize cost-benefit and value-for-money scenarios,
12. Support and integrate the needs of academic and research mandates,
13. Consolidate outpatient services, and
14. Capitalize on retail and commercial opportunities

Many of these drivers fall within the broader categories that define project success that were captured in the co-created” Balanced Scorecard”. This scorecard summarizes project objectives under four categories: Image and Message, impact and Function, Value for Money and Legacy.

Community Outpatient Centre

Given the agreement to purchase a 15-acre parcel of land in Bayers Lake, The DTIR directed the programmers and master planners to proceed to develop a concept master plan for the community outpatient site at Bayers Lake. A study of precedents explored a simple grid concept that allows for easy access to clinical services with optimal flexibility for future growth. An opportunity exists to leverage the geographic context to develop a building that respects the environment from a sustainability perspective that will afford patients magnificent views and staff, a healthy work environment.

Next Steps

Each of the explorations noted are currently being evaluated in greater detail following which, a comprehensive summary of the pros and cons of each exploration will be made against an agreed upon set of evaluation criteria. The intent of this exercise is to ensure that key stakeholders fully understand and capture the relative merits and demerits of each option in order that a collaborative decision can be made as to which alternative option best meets the project principles and criteria and offers the best value for money.

Kasian has also been requested to review the relocation of the Cancer Ambulatory Programs from the Dickson Building to the HI site to create a comprehensive centre for Cancer care that is patient centric. Kasian and DTIR are reviewing the additional scope of work, which will extend the original completion schedule of Dec. 2017.

Note: It should be noted, that in July, 2017, DTIR retained a procurement advisor to collaborate with Kasian in order to establish which type of financing and procurement model is most appropriate and marketable for each construction phase of the preferred master plan.

1

Introduction

1.0 Introduction

1.1. Project Intent

Connected Care for Nova Scotians

The purpose of this project is to develop a master program, selective functional programs and master plan for the QEII Health Sciences Centre for the Halifax Infirmary (HI) and Victoria General (VG) sites. The intent of the master program and master plan is to provide a long-term road map for development to provide **"Connected Care for Nova Scotians"** for the next 50 years, ensuring that the appropriate programs and services are provided in the right locations to achieve excellence in health, learning and research.

The aging infrastructure of the Victoria and Centennial Buildings on the VG site means that the organizations ability to deliver quality care within the context of current space and operational standards is greatly diminished. Functioning facilities that are operationally obsolete is a risk that is no longer acceptable. They have been identified by NSHA as Tier 1 priority projects for demolition. While there is an urgency to decant programs from these two buildings and demolish the buildings, it is important that an overall strategy for master programming and planning be developed to create a rational, long-term development pattern for the sites. This will ensure that long- term thinking on where and how programs and services are provided, and redevelopment opportunities as other buildings continue to age are carefully considered and factored into the decisions about critical immediate projects. The master plan will be a framework for development that will allow for flexibility, growth and change over time and a regeneration of the sites. The master program/ master plan will inform and support the immediate Tier 1 projects, while the broader implications and complexities of decisions made on priority projects will affect the long- term viability of the site. The master program/ master plan also needs to consider the role and integration of other facilities and services within the central zone.

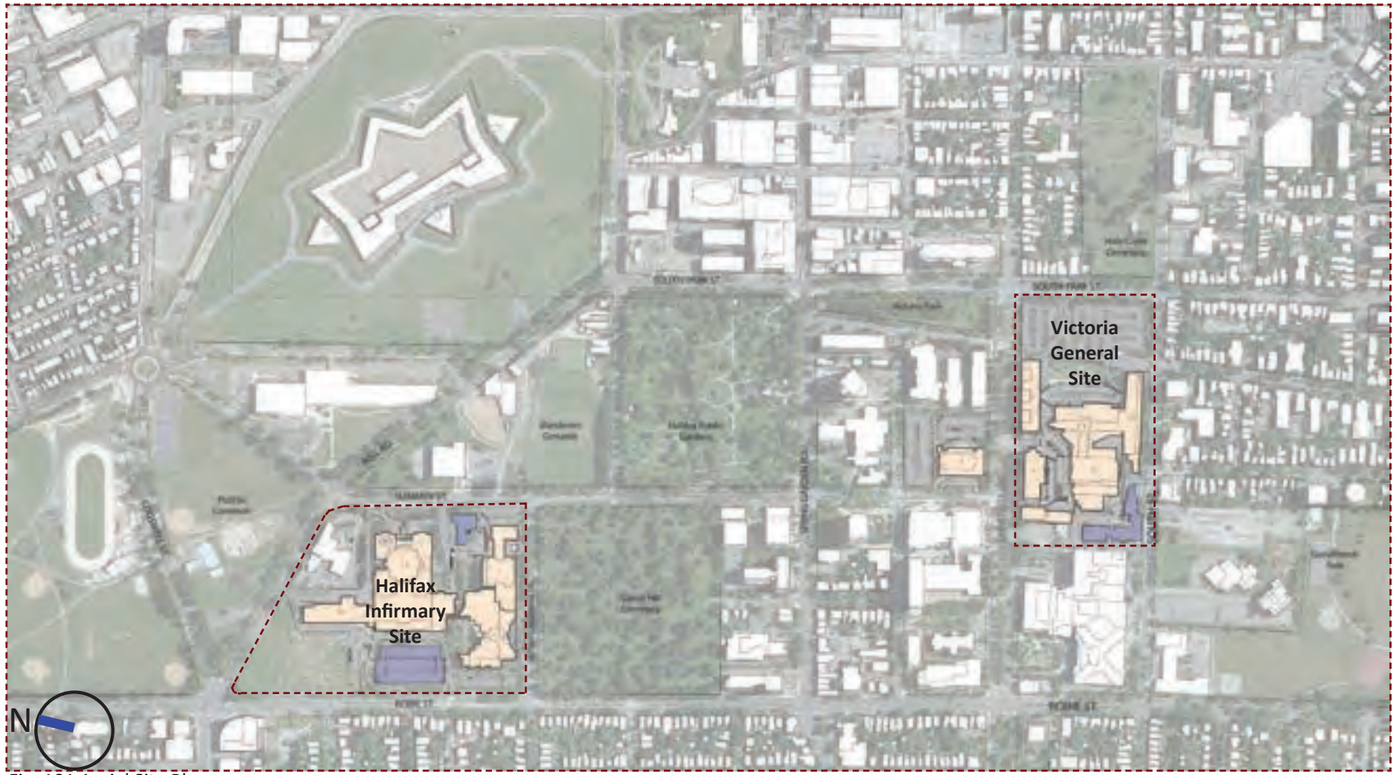


Fig. 101 Aerial Site Plan

Fig. 102 Historical Map

Nova Scotia Health Authority (NSHA) provides health services to Nova Scotians & some specialized services to Maritimers & Atlantic Canada. NSHA operates hospitals, health centres & community based programs across the province, educates the health care professionals of tomorrow & conducts ground breaking research.

NSHA is a hub of cutting edge discovery & innovation. Partnerships with IWK Health Centre & other academic institutions including Dalhousie University create a world leading research environment.

Within NSHA there are 4 managements zones - Western, Northern, Eastern, and Central. The Central Zone (where the Queen Elizabeth II Health Sciences Centre is located) is made up of 10 locations including a number of community based centres that serve patients & citizens closer to where they live.

central zone
NSHA

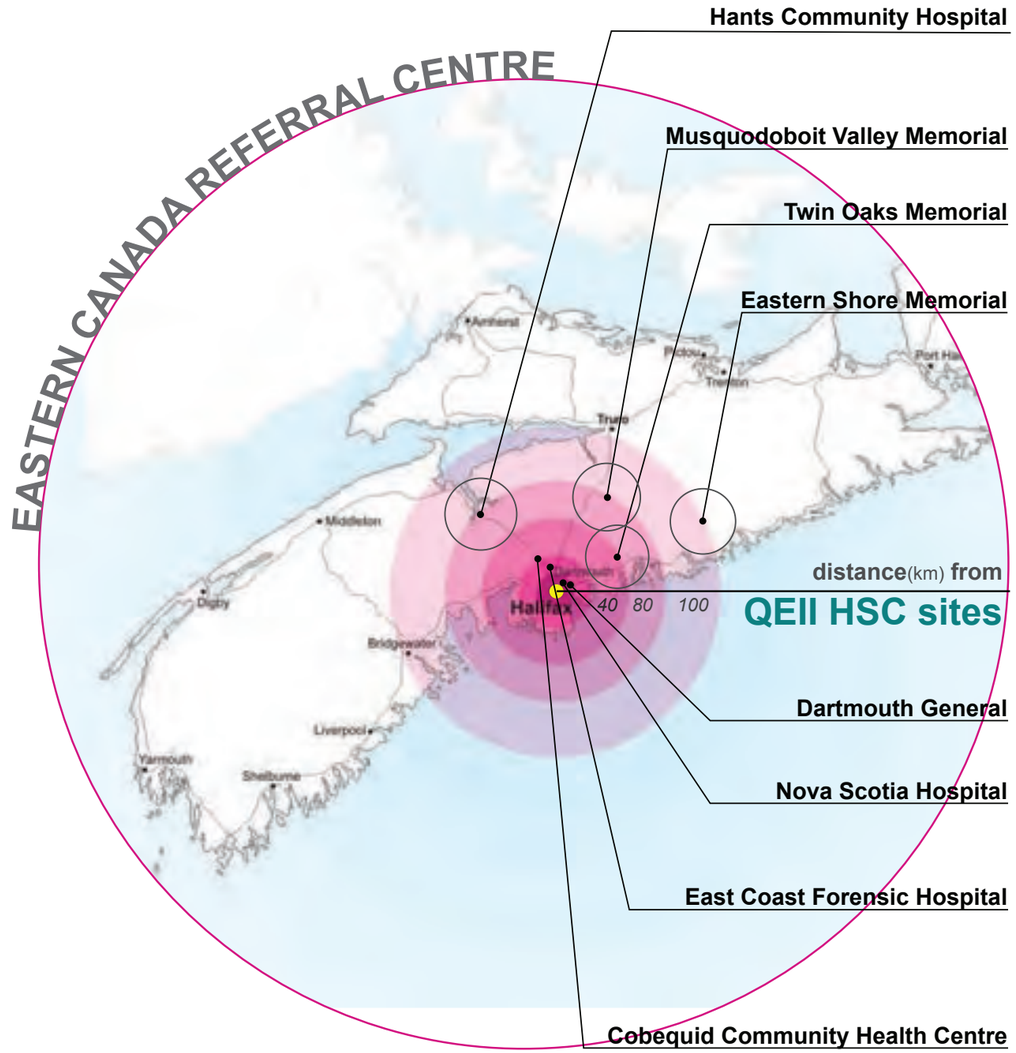


Fig. 103 Central Zone

The following is the Vision, Mission & Values statement of NSHA:

VISION	MISSION	VALUES
HEALTHY PEOPLE, HEALTHY COMMUNITIES — FOR GENERATIONS	TO ACHIEVE EXCELLENCE IN HEALTH, HEALING AND LEARNING THROUGH WORKING TOGETHER	RESPECT, INTEGRITY, INNOVATION, COURAGE, ACCOUNTABILITY

VISION
Healthy people, healthy communities - for generations.

MISSIONS
To achieve excellence in health, healing and learning through working together.

VALUES

Respect
Underlies our interactions with each other and the people we serve. It insists on caring, compassion and understanding, and embraces our diversity and differences to foster a positive environment for good health.

Integrity
Is at the heart of who we are and what we do. In a world that constantly challenges us, our integrity guides us to do what is honest and ethical.

Courage
Strengthens our resolve to do what is right for the health and wellness of Nova Scotians. We must, as an organization and as individuals, listen to others, have open and honest conversations, and make difficult decisions.

Innovation
Requires inquisitiveness, focused attention and creative solutions. We welcome and seize opportunities to create value. It is through our pursuit of excellence, individually and collectively, that new ideas and knowledge can emerge to advance health, healing and learning.

Accountability
Is our individual and organizational duty to be answerable to the people we serve and each other. It means our decisions and actions are transparent, based on evidence and focused on positive outcomes. We manage ourselves and our finite resources to ensure an effective and sustainable health and wellness system in Nova Scotia.

1.0 Introduction

1.3. QEII Health Sciences Centre - Facilities and Program Overview

As one of only 17 academic health sciences networks in Canada, The Queen Elizabeth II Health Sciences Centre (QEII) provides primary and secondary care services to people in the zone, and specialized tertiary care- including heart surgery and cancer treatment- to residents from across Nova Scotia, New Brunswick and Prince Edward Island. At the most advanced level of health care, QEII provides quaternary care services in areas such as organ and stem cell transplantation to patients throughout Atlantic Canada.

The QEII Health Sciences Centre is made up of two sites located in downtown Halifax - Halifax Infirmary and Victoria General- situated within close walking distance of each other.

Currently, the QEII Health Sciences Centre's clinical services include:

- 26,000+ surgical visits
- 950+ inpatient beds
- 546,000+ outpatient visits
- 1,200+ active research projects
- 7,000+ staff
- 700+ medical doctors
- 1,200+ volunteers

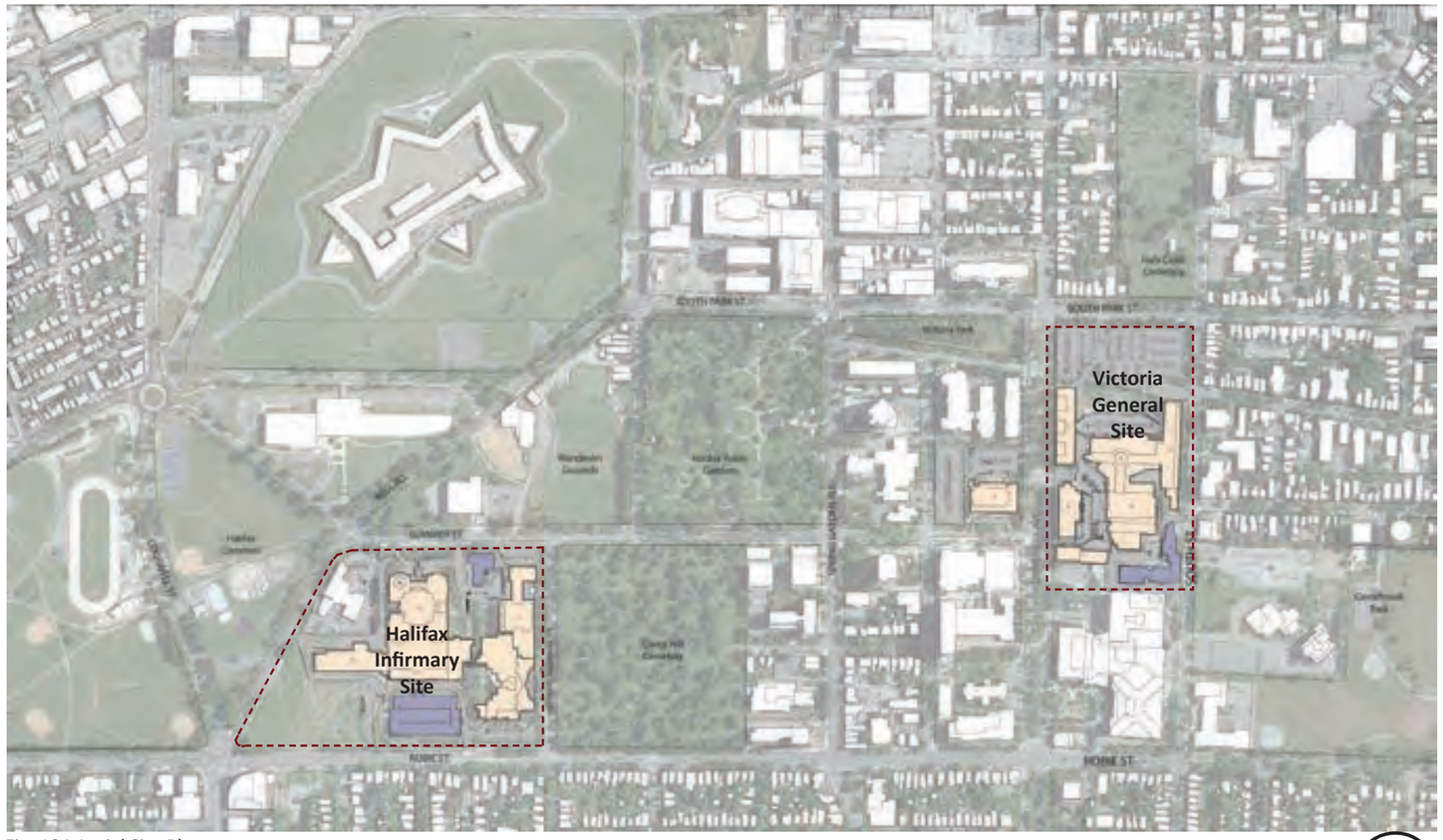
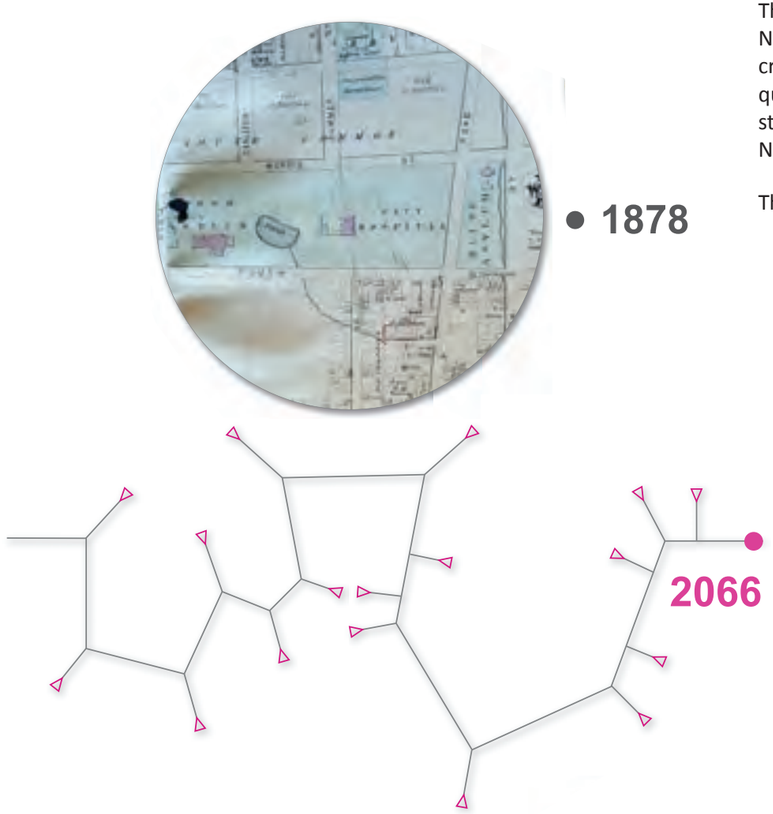


Fig. 104 Aerial Site Plan

1.0 Introduction

1.4. Master Program and Master Plan- Methodology and Approach



The master program and master plan consists of four major phases of work. The intent is that each phase will be a highly collaborative effort, engaging NSHA QEII redevelopment team and staff in meaningful dialogue about creating appropriate solutions for development to improve access to and quality of health care for patients, to create healthy work environments for staff, and to expand on the cutting edge research currently undertaken by NSHA.

The phases of the master program and master plan project are:

Fig. 105 Historical Development

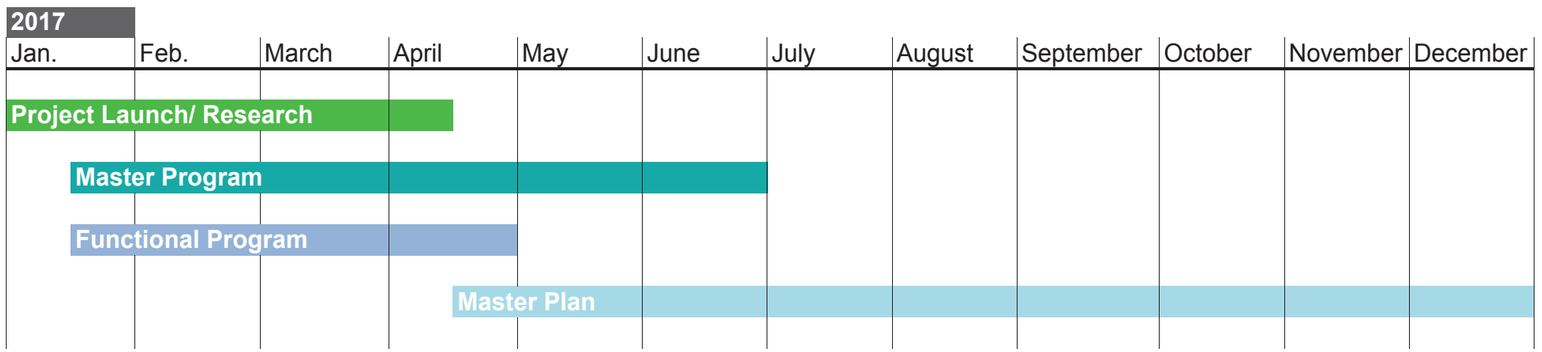


Fig. 106 Project Timeline

1. Project Launch/Research

During this phase, the consultants conducted research on the existing clinical services, facilities, infrastructure and sites and review background reports and previous master planning documents, including:

- NSHA strategic plan
- Clinical services plan
- Previous planning documents
- Existing drawings by department, location, key adjacencies and area
- Facilities assessment reports
- Transportation studies
- Environmental Assessments
- Municipal and zoning requirements
- Current proposed renovations and expansions considered

The research that is conducted by the master planning team during this phase will inform the development of the master program, functional programs and master plan for the QEII Redevelopment, including an analysis of the opportunities and risks of future developments.

Projected clinical and support services workloads will be developed by the Health Informatics consultant during this phase for the programming team to use in the development of the master program. Taking a broader, systemic approach, the Health Informatics team will consider key population demographic indicators, socio-economic indicators of health status, morbidity and mortality projections, and reviewing of hospital utilization by levels of care and will include an analysis of length of stay, ER visits, admission rates, utilization rates per population, day surgery rates and occupancy levels.

Also during this research stage, the design team and its sub consultants will be reviewing existing facility assessment documentation and conducting site tours to ascertain the utility, servicing, capacity, useful life span and ability to adaptively re-use any of the existing infrastructure. This information will be used to support new build verses renovation options considered during the master planning phase.

1.0 Introduction

2. Master Program

The Master Program is a comprehensive document outlining current and projected services, volumes operating principles and component space requirements. It describes the space requirements as well as required departmental adjacencies and relationships. These services may be new, changes to existing services or reflect a change in the model of care. The impacts on space of these programs and services are projected for 5, 10 and 20 years into the future.

The master program will collectively provide the foundation for the master plan, identifying future major room elements, space, location and adjacency recommendations to inform the long-term redevelopment strategy for each site. The planning parameters, future service model assumptions and workload projections by service will provide the context and foundation for this work.

The quality and quantity of space available in each program area will be evaluated against contemporary planning guidelines.

Key considerations will include:

- Access to the space
- The organization of the space
- Required space relationships and adjacencies with other key areas
- The availability of essential room/space elements

On completion of the master program spreadsheets, the priorities for redevelopment will be determined with the project steering committee by applying a set of pre-established criteria.

3. Functional Program

The functional program builds upon planning from the Master program stage and describes in much more detail the linkage between program/service elements and physical elements. It provides a description of the proposed functions, activity and resources of a service/ department, together with a listing of space needed to support them.

The functional program serves several purposes:

- an internal record of planning decisions
- a means of communication with government decision-makers and advisory organizations such as the Department of Health and Wellness
- an instruction to the architectural and engineering team for the preparation of preliminary building designs; specifically block schematic and sketch plans
- a base to begin equipment planning, as appropriate, and inform budgeting and transition plans

As part of the scope of the master programming/ master planning team, functional programs will be provided for the following priority areas currently located in the Victoria and Centennial Buildings:

- Perioperative
- Administration
- Diagnostic Imaging
- Ambulatory Care
- ICU/IMCU
- Inpatient
- Research/ Academic

4. Master Plan

The master plan translates the master program into a physical plan, analyses site use options for potential development scenarios, (including renovation, new build interconnected to existing buildings and greenfield new build) and defines the predicted stages of development for the facility. The master plan sets out proposals for buildings, open spaces, traffic strategy and land use in three dimensions developed in parallel with a delivery strategy and implementation plan. The master plan provides a framework for development phasing based upon priorities for redevelopment. A detailed capital cost report (Class D) based on this phasing plan, will be included.

The master plan includes:

- Location of major elements, buildings and open space
- Block and stack diagrams of program spaces showing location and adjacencies, and which programs will be housed in new or renovated spaces
- Entrances to and exits from the site and buildings on the site
- Impacts of proposed development on existing infrastructure
- Utilities
- Site services
- Parking
- Obsolete buildings and plants that need renovation or replacement
- Phasing and decanting strategy
- Options for future expansions
- Municipal and regulatory requirements including zoning, easements, air rights, heritage considerations
- Capital Cost estimate

1.0 Introduction

1.5. Master Planning Key Drivers and Principles

The Master Plan is driven by various factors, including:

- **Reflect the values and vision of the hospital;**
- **Maximize site utilization** based on available land and site coverage restrictions;
- **Create a rational growth pattern**, while maintaining operational efficiencies and recognition of the existing facility condition and permitting long term development;
- Ensuring that the Master Plan is a framework for development with the ability to **permit flexibility, growth and change**;
- A **phased development**, ensuring that engineering facility capacity requirements are addressed;
- **Urban connectivity** with the City of Halifax and views adjacent parks;
- Create intuitive **wayfinding,** refine internal circulation;
- **Accommodate program growth** and decompression, based on volume growth projections and program priorities;
- **Continuous clinical functionality** at each phase to permit optimum service delivery;
- **Enhanced patient experience** within a healing environment, natural light and views to parks;
- **Optimized cost benefit**, with full recognition of existing facility condition and replacement needs;
- Reflect **environmental influences** & sustainable development approach;
- **Integration of academic & research**;
- **Co-locate** outpatient services;
- **Capitalize on retail/commercial opportunities.**
- **Capitalize on innovative approaches to patient care and building infrastructure.**

Fig. 107 Wayfinding - Building Identity

Fig. 108 Environmental Influences

Fig. 109 Healing Environments

Fig. 110 Urban Connectivity

kasian

Summary

Summary of Space – Functional Programs

Figure 7 identifies the total departmental gross square feet (DGSF) by functional program section.

Figure 7: Functional Program Summary of Space

		Departmental Gross Area (sq ft)			
		Current		Projected	
		VG	HI	VG	HI
HI SITE					
Clinical and Diagnostic Services					
1	Ambulatory Care Clinics				
	• Medical/Surgical Clinics	72,573	35,221 [a]		128,530
	• Renal Program	(23,236)	(8,274)		30,230
	• Outpatient Specimen Collection	1,425	(1,954)		4,675
2	Ambulatory Procedure Unit	5,438	6,151		35,025
3	Critical Care Unit	-- [b]	(70,139)		58,970
4	Diagnostic Imaging – Acute Care	49,691	40,371		44,849
5	Diagnostic Imaging – Ambulatory Care				
	• Acute Ambulatory Building - Imaging	--	--		14,003
	• Ambulatory Imaging at the Cancer Centre, including Cyclotron (3,987)	--	--	23,537	
6	Eye Care Centre	-- [c]	--		42,055
7	Heart Health Clinics and Diagnostic Services	-- [c]	16,333		47,950
8	Hyperbaric Medicine	1,589	--		8,640
9	Medical Day Care Unit	15,549	--		10,285
10	Medical/Surgical Inpatient Units	94,331	(116,015)		149,930
11	Pharmacy	(23,753)	(7,354)		14,980
12	Surgical Suite, including Pathology Laboratory and MDR	42,295	(52,000)		73,225
Corporate and Support Services					
13	Academic Medical Staff/Administrative Services	-- [d]	-- [d]		79,200
14	Research and Learning	-- [e]	-- [e]		34,430
Total - Halifax Infirmary (HI) Site					**776,977**

Figure 7: Functional Program Summary of Space (cont'd)

		Departmental Gross Area (sq ft)			
		Current		Projected	
		VG	HI	VG	HI
OTHER					
15	Community Outpatient Center	--	--		**99,990**
	A Family Practice Team and Urgent Care Centre				*9,245*
	B Diagnostic Services, including Outpatient Specimen Collection				*11,390*
	C Dialysis/Renal Services				*16,990*
	D Medical/Surgical Clinics				*17,805*
	E Mental Health and Other Community Services - Placeholder				*15,000*
	F Rehabilitation				*8,330*
	G Public Space				*9,750*
	H Administration and Support Services				*11,480*
Grand Total - Departmental Gross Area (square feet)		**282,891**	**98,076**	**23,537**	**876,967**

[a] Includes Eye Care Centre, Heart Health Clinics and Diagnostic Services.
[b] Assume in Medical/Surgical Inpatient Units.
[c] See footnote a.
[d] See Master Program #14 Academic Medical Staff/Administrative Services.
[e] See Master Program #24 Research and Learning.

Note: Space measurement provided by Kasian Architects (April 11, 2017). Numbers in brackets are recorded in the master programs.

Summary of Space – Master Programs

Figure 8 identifies the total projected departmental gross square feet (DGSF) by master program section.

© Agnew Peckham, 2017. All rights reserved; unauthorized use, distribution, publication or reproduction prohibited.

1.0 Introduction

1.6. Master Programming & Functional Programming Summary

Figure 8: Master Program Summary of Space

		Master Program					Functional Program			
		Current DGSF [a]		Projected			Projected			
		VG	HI	5 Years	10 Years	20 Years	5 Years	10 Years	20 Years	Comments
HI SITE										
Clinical and Diagnostic Services [b]										
1	Abbie J. Lane Mental Health Centre		60,358	85,000	97,000	97,000				
2	Cancer Care Program	69,327		109,710	124,377	136,988				
3	Critical Care		70,139	37,200 [c]	40,800 [c]	45,600 [c]	(58,970)	(58,970)	(58,970)	48 beds. See Critical Care Functional Program
4	Emergency		48,347 [d]	48,350	58,700	58,700				
5	Heart Health – Procedure Suite		8,030 [e]	25,000	25,000	25,000				
6	Laboratory Services [f]			6,500	6,500	6,500				Incl. receiving, RRL, transfusion, inpatient phlebotomy
	• Laboratory	3,150	7,696							
	• Pathology/frozen section		*incl. above*				(1,370)	(1,370)	(1,370)	Space included in Surgical Suite FP
	• Outpatient blood collection	1,425	1,954				(4,675)	(4,675)	(4,675)	Space included in Ambulatory Care Clinics FP
	• Outpatient blood collection at COC		--				(7,440)	(7,440)	(7,440)	Replaces Bayers Lake centre which is 4,850 SF; space included in COC FP
7	Medical/Surgical Inpatient Units	94,331	116,015	116,015	300,750	328,100	(149,930)	(149,930)	(149,930)	Future: 5 new units; incl satellite pharmacy
8	Pharmacy									
	• Main/satellite	15,904	7,354	--	--	--	(14,980)	(14,980)	(14,980)	See Pharmacy Functional Program
	• Provincial Centre	7,849		--	--	--				Off-site
9	Rehabilitation/Complex Continuing Care Services [g]			294,771	295,466	295,466				
	• Nova Scotia Rehabilitation and Arthritis Centre (NSRAC)	93,546								
	• Rehabilitation/complex continuing care		145,985							
10	Renal Program			11,019	11,019	11,019				Inpatient stations
	• HI Acute Ambulatory Block	23,236 [h]	8,274 [h]				(30,230)	(30,230)	(30,230)	18 stations, home program, regional program offices, incl. in Ambulatory Care Clinics Functional Program.
	• Community Outpatient Building						(16,990)	(16,990)	(16,990)	18 stations plus allowance for 6 additional stations in 10 year time frame. Included in Community Outpatient Center Space List
11	Respiratory Therapy	4,018	1,710	1,850	1,850	1,850				Additional space in Critical Care FP
12	Sleep Disorders Service		5,429	6,000	6,000	6,000				
13	Surgical Suite	42,295	52,000	52,000	60,000	68,000	(73,225)	(73,225)	(73,225)	Space included in Surgical Suite FP
Subtotal - Clinical and Diagnostic Services		355,081	533,291	793,415	1,027,462	1,080,223				

Figure 8: Master Program Summary of Space (cont'd)

		Current DGSF [a]		Master Program Projected			Functional Program Projected			
		VG	HI	5 Years	10 Years	20 Years	5 Years	10 Years	20 Years	Comments
Corporate and Support Services										
14	Academic Medical Staff/Administrative Services (HI and VG Sites)									
	• Medical Offices	36,135	48,587	44,928	44,928	44,928	(69,875)	(69,875)	(69,875)	Space included in Academic Medical Staff/Administrative Services FP
	• Corporate Administration	13,598	14,417	22,449	21,174	21,174	(9,325)	(9,325)	(9,325)	
15	Biomedical Engineering (HI Site)		4,495	8,750	8,900	9,075	(615)	(615)	(615)	Incl. in Surgical Suite Functional Program
16	Facilities Management (HI Site)		21,250	11,165	11,165	11,165				
17	Health Information Services (HIS) (HI Site)		2,610	3,400	2,800	2,800				
18	Housekeeping, Laundry and Waste Services (HI Site)		430	5,800	5,800	5,800				
19	Information Technology (IT) (HI Site)		9,045	3,600 [i]	3,600 [i]	3,600 [i]				
20	Medical Device Reprocessing (HI Site)		18,915	--	--	--	(20,860)	(20,860)	(20,860)	See space list in Surgical Suite Functional Program
21	Nutrition and Food Services (HI Site)		39,070	42,615	42,615	42,615				
22	Porter and Mail Services (HI Site)		890	5,400	5,400	5,400				
23	Public Areas (HI Site)		**Unknown**	50,000	51,500	54,000				
24	Research and Learning (HI and VG Sites)	143,273	23,980	130,648	76,186	76,186	(34,430)	(34,430)	(34,430)	Space included in Research and Learning FP
25	Security (HI Site)		940	940	940	940				
26	Supply Chain (HI Site)		9,800	16,400	16,400	16,400				
27	Volunteers	2,325	966	2,065	2,065	2,065				
Subtotal - Corporate and Support Services		195,331	195,395	348,160	293,473	296,148				
Total - Departmental Gross Area (square feet) - HI Site		**550,412**	**728,686**	**1,141,575**	**1,320,935**	**1,376,371**				

1.0 Introduction
1.6. Master Programming & Functional Programming Summary

Figure 8: Master Program Summary of Space (cont'd)

	Master Program					Functional Program			
	Current DGSF [a]		Projected			Projected			
	VG	HI	5 Years	10 Years	20 Years	5 Years	10 Years	20 Years	Comments
VG SITE									
Corporate and Support Services									
28 Biomedical Engineering	6,930		1,400	1,400	1,400				
29 Facilities Management	14,412		2,600	2,600	2,600				
30 Health Information Services (HIS)	7,670		900	650	650				
31 Housekeeping, Laundry and Waste Services	12,495		5,100	5,100	5,100				
32 Information Technology (IT)	18,880		15,700 [j]	15,700 [j]	15,700 [j]				
33 Medical Device Reprocessing	11,325		--	--	--				
34 Nutrition and Food Services	30,230		15,930	15,930	15,930				
35 Porter and Mail Services	815		1,825	1,825	1,825				
36 Public Areas	**Unknown**		13,920	13,920	13,920				
37 Security	800		300	300	300				
38 Supply Chain	29,520		12,460	12,460	12,460				
Total - Departmental Gross Area (square feet) - VG Site	**133,077**		**70,135**	**69,885**	**69,885**				

[a] Space measurements provided by Kasian Architects (April 11, 2017).
[b] Please refer to the following Functional Programs for information on services: Ambulatory Care Clinics, Ambulatory Procedure Unit, Diagnostic Imaging - Acute Care, Diagnostic Imaging - Ambulatory Care, Eye Care Centre, Hyperbaric Medicine, and Medical Day Care Unit.
[c] Current plus expand into space vacated by medical/surgical/neuro ICU. Assumes approximately 1,200 DGSF per bed. Locate adjacent to IMCU beds: 16 cardiovascular and 21 cardiology.
[d] Excludes CDU.
[e] Located adjacent to IMCU beds: 16 cardiovascular and 21 cardiology.
[f] Assumes McKenzie Building remains (i.e., 91,808 DGSF).
[g] Including Nova Scotia Rehabilitation and Arthritis Centre (NSRAC), Progressive Care, Restorative Care, Behavioural (new) and Veterans Services.
[h] Excludes office in Bethune. Includes HI Level 1 and VG.
[i] Note: If the Core Team office space is not located at the VG site or in an off-site facility within walking distance, it will need to be added to the HI site. The Core Team requires 14,500 DGSF [see program 32, Information Technology (IT) (VG Site)]
[j] Assume Area 2: Core Team is located at the VG site. This 14,500 DGSF component could be moved off-site or to the HI site.

kasian

Priorities for Redevelopment

Figure 9 identifies the relative priority for redevelopment of each program/service/department.

The definitions and criteria at the bottom of Figure 9 have been provided to inform priority-setting for the purposes of master planning. Please refer to the Master Program sections and the Functional Assessment for the information used to inform the rankings. The architects and engineers will conduct building and building systems assessments that will also inform master planning.

Figure 9: Priorities for Redevelopment (Based on Functional Assessments and QEII Directions)

Department/Service	Priorities for Redevelopment: Tier 1	Tier 2	Tier 3	Not a Priority (NAP)	Comments
Functional Programs					
1 Ambulatory Care Clinics	✓				Due to VG closure. Includes specimen collection, public areas and renal program.
2 Ambulatory Procedure Unit	✓				Due to VG closure. Includes satellite MDR
3 Critical Care	✓				Due to VG closure. Includes respiratory therapy.
4 Diagnostic Imaging - Acute Care	✓				Due to VG closure.
5 Diagnostic Imaging - Ambulatory Care					Due to VG closure.
• Cancer Centre	✓				
• Acute Ambulatory Building (AAB)	✓				
6 Eye Care Centre	✓				Due to VG closure.
7 Heart Health Clinics and Diagnostic Services	✓				Due to VG closure and Ambulatory Care strategy.
8 Hyperbaric Medicine	✓				Due to VG closure.
9 Medical Day Care Unit	✓				Due to VG closure.
10 Medical/Surgical Inpatient Units	✓				Due to VG closure. Includes Pharmacy
11 Pharmacy	✓				Due to VG closure.
12 Surgical Suite	✓				Due to VG closure. Includes Biomedical, MDR, Pathology/frozen section.
13 Academic Medical Staff/Administrative Services	✓				Due to VG closure.
14 Research and Learning	✓				Due to VG closure.
15 Community Outpatient Center	✓				Due to VG closure. Includes renal program, specimen collection - DI.
Master Programs - HI Site					
Clinical and Diagnostic Services					
1 Abbie J. Lane Mental Health Centre					
• Inpatient Units		✓			
• Ambulatory and Outreach Services and Offices			✓		
2 Cancer Care Program	✓				Functional Program developed in 2015. Due to VG closure.
3 Critical Care		✓			For beds not included in Functional Program, space requires significant expansion and redevelopment to bring facilities up to contemporary standards.
4 Emergency			✓		The mental health area should be addressed earlier.
5 Heart Health - Procedure Suite		✓			Space requires significant expansion and redevelopment to bring facilities up to contemporary standards.
6 Laboratory Services (Main Lab)					
• Specimen Collection (Acute Ambulatory Building and COC)	✓				
• Pathology/frozen section (Surgical Suite)	✓				
7 Medical/Surgical Inpatient Units (HI Site)		✓			Space requires significant expansion and redevelopment to bring facilities up to contemporary standards.
8 Pharmacy	✓				See Medical/Surgical Inpt Units Functional Program
9 Rehabilitation and Complex Continuing Care Services					
• Inpatient Units		✓			
• Ambulatory and Outreach Services and Offices		✓			
10 Renal Program	✓				Part of Ambulatory Care Clinics FP. Due to VG closure.
11 Respiratory Therapy				✓	Space added in critical care.
12 Sleep Disorders Service		✓			
13 Surgical Suite		✓			Expansion of prep/recovery, family waiting and consultation rooms are Tier 2.
Corporate and Support Services					
14 Academic Medical Staff/Administrative Services	✓				See Functional Program.
15 Biomedical Engineering (HI Site)	✓				See Surgical Suite Functional Program. Due to VG closure.
16 Facilities Management (HI Site)	✓				Due to VG closure.
17 Health Information Services (HI Site)			✓		
18 Housekeeping, Laundry and Waste Services (HI Site)	✓				
19 Information Technology (IT) (HI Site)			✓		
20 Medical Device Reprocessing (HI Site)	✓				Under-sized; poor workflow. See Surgical Suite.

© Agnew Peckham, 2017. All rights reserved; unauthorized use, distribution, publication or reproduction prohibited.

1.0 Introduction

1.7. Priorities for Redevelopment

Department/Service	Priorities for Redevelopment: Tier 1	Tier 2	Tier 3	Not a Priority (NAP)	Comments
Master Programs - HI Site					
Corporate and Support Services					
21 Nutrition and Food Services (HI Site)	✓				Address increased production.
22 Porter and Mail Services (HI Site)	✓				Due to VG closure.
23 Public Areas (HI Site)	✓				Tied to Acute Ambulatory Building. (See Functional Program)
24 Research and Learning	✓				See Functional Program. Due to VG closure.
25 Security (HI Site)	✓				
26 Supply Chain (HI Site)	✓				JIT implementation.
27 Volunteers	✓				Due to VG closure.
Master Programs - VG Site					
Corporate and Support Services					
28 Biomedical Engineering (VG Site)				✓	Remain in current
29 Facilities Management (VG Site)				✓	Remain in current
30 Health Information Services (VG Site)			✓		Could remain in Dickson
31 Housekeeping, Laundry and Waste Services (VG Site)	✓				Current facilities will be eliminated. Required for Cancer Centre and NSR.
32 Information Technology (IT) (VG Site)	✓				Due to VG closure.
33 Medical Device Reprocessing (VG Site)				✓	No facilities needed.
34 Nutrition and Food Services (VG Site)	✓				Current facilities will be eliminated. Required for Cancer Centre and NSR.
35 Porter and Mail Services (VG Site)			✓		
36 Public Areas (VG Site)			✓		In Cancer Centre and NSR.
37 Security (VG Site)		✓			In Cancer Centre and NSR.
38 Supply Chain (VG Site)	✓				For services remaining.

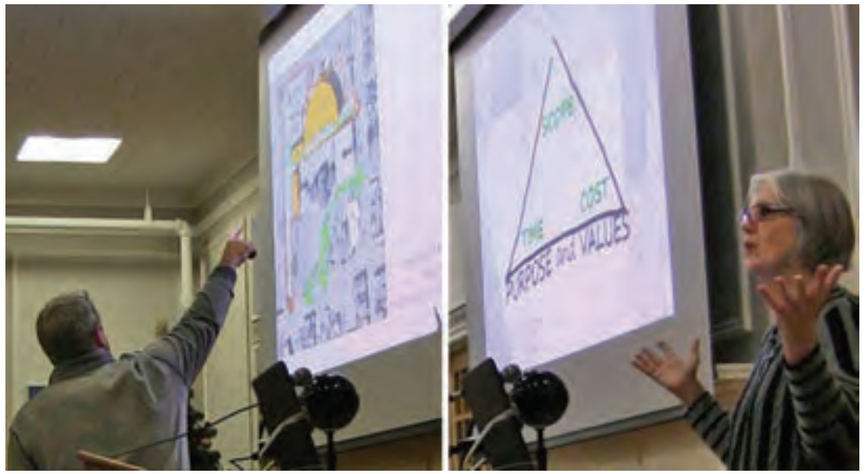
Definitions:

Tier 1: Requires immediate attention due to VG closure and conditions are extremely poor; should be addressed in the first phase of redevelopment.

Tier 2: Requires attention in 10 year timeframe; can continue to support functions despite substantial deficiencies.

Tier 3: Must be addressed in the master plan but is not a priority at this time.

Note: This report only includes the master programming and functional programming summary as well as the priorities for redevelopment. The full master programming and functional programming reports have been submitted under separate cover to DTIR and NSHA.



Common Ground Workshop

A Common Ground Workshop was held on December 13, 2016 prior to the start of the master programming/ planning work. The intent of the Common Ground workshop was to bring people together to think through big issues and concerns for this project. Common ground builds a shared understanding regarding goals, priorities and aspirations so that participants can make better decisions going forward. It also expands our understanding of what is possible.

At the session, the programming and design team revisited the assumptions regarding the task at hand, our expectations for the overall process, and identified a motivating high-level purpose for the project. The session also reconfirmed existing guiding principles and saw the co-creation of potential new criteria that will enable QEII to achieve its clinical and community objectives: delivering Connected Care for all Nova Scotians.

The Common Ground workshop was facilitated by Sharon Vanderkaay and Ian Sinclair.

1.0 Introduction
1.8. Common Ground Workshop

MEASURING WHAT MATTERS: The Facilities Balanced Scorecard

A key outcome of the Common Ground workshop was agreement on essential criteria for judging the project's success. These elements were captured in a Balanced Scorecard that served to guide project participants in evaluating options and making decisions. The scorecard also enabled them to monitor progress toward achieving strategic design and planning goals through all phases of the project.

Participants in creating the judging criteria included senior administrative and departmental directors, program VPs, QEII Redevelopment managers, architects and engineers.

The Facilities Balanced Scorecard was designed to monitor planning "vital signs" so that Success Factors identified at project launch time are not lost or diminished as the plan proceeds through to final approval. It is a quick reference guide that indicates how well we (the design team together with QEII stakeholders) were doing in relation to what we intended to deliver.

The scorecard header includes a project Purpose Statement which serves as the foundation for what is often called the "iron triangle" of project management delivery formed by scope, time and cost.

Avoiding a "Say-Do" Gap

The scorecard consists of four categories that provide a balanced perspective on project requirements. These categories are: Image & Message, Impact & Function, Value for Money and Legacy. This high level "back of envelope" tool provides strategic, aspirational statements within each category that were rated by the group on a scale of one to five. If a "Say-Do Gap" was identified between previously stated principles and priorities as compared with the reality of the evolving plan, the group decided how to address that gap.

Shared Accountability for Results

This scorecard document was not intended to be used as a sole and comprehensive decision-making tool, but rather as a summary reference document for monitoring progress relative to original intentions. The overall approach highlights specific shared interests that motivate everyone to fight for the same goals at all stages of the project. It is a tangible means for promoting a sense of stewardship and shared accountability for results.

A draft scorecard was sent to designated QEII representatives for their review and adjustment. The revised scorecard was then distributed to all Common Ground participants as the standard by which all design options were to be evaluated.

QEII Health Sciences Centre Redevelopment

Balanced Scorecard

The **PURPOSE** of this project is to enhance our capacity to achieve excellence in health, healing and learning through working together.

IMAGE & MESSAGE

- The Master Plan conveys a sense of safety, security and quality.
- The Master Plan aligns with and supports the overall QEII HSC objectives as a leading academic, teaching and research organization.
- The Master Plan applies evidence-based approaches to help advance the project through all approval authorities.
- A strategic communication plan serves to keep stakeholders informed including, patients, staff, physicians, the broader community, the media and all authorities with jurisdiction.

IMPACT & FUNCTION

- The Master Plan supports the principles of patient-centered care within a context of operational efficiency.
- The Master Plan enables inter-professional collaboration delivering integrated care, learning and research.
- The Master Plan enhances QEII's reputation for provision of high quality care to all people across the Maritimes.
- The Master Plan reflects service locations that improve access for all users.

VALUE for MONEY

- The Master Plan builds on previous planning studies and Guiding Principles.
- The Master Plan embodies principles of sustainability, maintainability and optimal, affordable operating conditions.
- The Master Plan includes the potential for enhanced revenue generating opportunities.
- The Master Plan is aligned with procurement models that will help to ensure optimal value for money.

LEGACY

- The Master Plan will be leveraged to attract and retain the brightest and the best.
- The Master Plan reflects "future-proofing" strategies to enable adaptability as healthcare delivery and government priorities change over the next 30-50 years.
- Aligned with our Values, the Master Plan contributes to an effective and sustainable health and wellness system in Nova Scotia.

DATE: 3 March 2017

1 2 3 4 5
no----------yes

Fig. 111 QEII Balanced Scorecard

Lean Design

Lean Overview
Lean is a systematic approach to identifying and eliminating wasteful activities in a process through continuous improvement. The key focus of Lean Thinking is identifying value from the perspective or lens of the patient. Activities in a process are viewed through this lens by distinguishing value-added steps from non-value-added steps. Wasteful activities are eliminated until, eventually, every step adds value to that process. By minimizing/eliminating wasteful activities, a Lean process can be achieved through enabling the flow of a product or service at the pull of the patient, so that the service can be responsive to patient needs.

The term 'Lean' is applied to a process because a Lean process utilizes:

- Less operational space
- Fewer financial resources
- Fewer materials and services
- Less time to deliver a service to its patients

Lean Thinking is not a manufacturing strategy or a cost-reduction program, but a philosophy that can be applied to a variety of organizations. This is because it is focused on processes. All organizations are made up of a series of processes, sets of activities or steps intended to create value for people who are dependent on them - namely patients and colleagues.

Lean Thinking is based around the application of a number of tools and strategies aimed at streamlining all aspects of a process. These tools are intended to reduce unnecessary labor, space, capital, materials, equipment and time involved in the delivery of appropriate services to customers.

Using the principles and tools associated with Lean to reduce and eliminate waste enables organizations to increase their quality of service. It enables them to:

- Operate more quickly and efficiently at lower costs
- Become more responsive to the needs of patients
- Focus on quality
- Increase service levels without increasing costs

Lean principles and tools help organizations to ensure their employees' experience increased job satisfaction and their patients receive the best possible service.

Lean Principles
The five (5) key Lean principles are applied to continuously improve operational efficiency from the perspective of the patient/customer.

1. Specify value
    - Understand the process activities that your patient/customer values

2. Identify the value stream
    - The series of actions that collectively build value for the patient/customer is the value stream. Identify and eliminate non-value-added activities

3. Establish flow
    - Strive to implement a process in which value-creating activities can move quickly, seamlessly, with minimal effort and without backtracking or rework

4. Implement pull
    - Have the cadence or rhythm of activity, driven by being pulled from the patient/customer at the end of the process, rather than pushed by the producer or supplier to the process

5. Pursue perfection
    - Constantly learn, improve and sustain

1.0 Introduction

1.9. Lean Design

Wastes
During a Lean review, all processes, activities, space, design and layouts can be examined with a view to finding waste across eight common sources. Table 1 below provides a description of each of the eight wastes.

Waste	Definition
Transportation	Unnecessary movement of inventory, materials, equipment, supplies and products.
Over-production	Producing more information than the customer needs in order to manage the next step in the process, or producing something before it is actually required.
Motion	Unnecessary movement of staff members in order to complete their daily work activities.
Inventory	Keeping excessive inventory and products that are not being processed which ties up money and reduces available space.
Waiting	Wasted time waiting for the next step in the process to occur.
Excessive processing	Excessive processing work that is not required by the customer and adds no value but consumes resources.
Defects	Defects that need to be corrected through rework.
Non utilized staff creativity	Staff performing functions that are better suited to other grades of staff.

Table 1: The eight wastes

While not all wasteful activities can be eliminated, the goal is to minimize the time spent on activities that patients *do not* value in order to free up capacity for those tasks and activities that patients *do* value.

It is important to note that one person cannot determine if a task/activity is wasteful, a team effort is required to identify waste and ensure that cross functional team perspectives are considered.

Lean-led Design
Lean driven design consciously and deliberatively engages facility stakeholders with a focus on reviewing operational processes to eliminate waste and improve efficiency. The process focuses stakeholders on how healthcare services could be delivered in the future and uses data to develop the ideal future state which is efficient and waste free.

The Lean design process works in conjunction with the functional planning role to gather information about the intended operations. However, the future state focus ensures that the operations for the newly built or renovated facility are efficient. This encourages smaller design iterations and, therefore, no “overbuild” occurs.

Lean design involves the formation of multi-disciplinary teams, in collaboration with architects, functional planners and engineers during the master planning phase to develop an optimal arrangement of halls, rooms, elevators, corridors, walls and voids to support the optimal patient flow for each care pathway and supporting service streams.

The aim is to create flows that do not generate a backlog of patients due to bottlenecks. A bottleneck is created when the built structure results in extra (additional) motion and transportation, which then increases the cycle time of hospital service delivery. The key question that Lean design addresses is how much of the development/renovation is conducive to Lean best practices of continuous flow and co-located functions.

Furthermore, Lean-led design aims to curb over consumption of building material, equipment, space and energy. This approach will also assist architects and engineers in innovating to create capacity, whilst limiting investment in the built infrastructure. This will also build flexibility into the design of co-location, adjacency, and voids (spaces) to cater for increased volumes of patient flow and perhaps even new flows that cannot be predicted now. The hospital should be design and right sized for patient flow as opposed to “right sized” for disciplines and functions. Hospital design and construction time may also be drastically reduced.

Principles of Lean design at the master planning stage

1. Engage key stakeholders from the hospital to gain their expertise and insight into current flows, patient needs, trends, etc.
2. Work with architects, engineers and functional planners to define effective co-location, adjacency and spacing to enable both the primary flow of patients and the secondary flow of intersecting service streams with the least amount of motion and transportation.
3. Determine the optimal arrangement of the functions within the flow. Alternative arrangements (layouts) are determined and the team decides on the best option. The optimization is driven by data, mainly centering on volumes of services and cycle times required to effectively deliver each service.
4. Identify operational spacing requirements based on human considerations as well as physical requirements of equipment and operations.
5. Assess and determine optimal patient waiting areas; storage locations; space to enhance aesthetics; etc. This ensures that space is not consumed more than necessary for now and into the future.
6. All design and layout optimization is driven by data, mainly centering on improved outcomes

Summary considerations

- View services based on the overall pathway of care and not a specific functional silo
- Co-locate services where appropriate
- Share spaces between services
- Implement a visual workplace
- Use standardized layouts to minimize variations in service delivery
- Consider all forms of waiting to be waste
- Fully account for all spaces
- Keep way-finding clear, direct and intuitive
- Aim for flexibility and ease of change in the future
- Minimize or eliminate all bottlenecks to flow
- Keep motion and transportation of patients, care providers, support staff, information, materials, supplies, etc. to a minimum

Examples of effective Lean design

- Adjacency of ER and ICU: A hospital saved 16.4 meters in length equating to 11 seconds of time and 21 steps of healthcare provider per patient in transportation.
- Adjacency of the three critical spaces – trauma/resuscitation, seclusion and decontamination: ED response is contained within a 7.22 meter radius of ambulance entrance. This resulted in a 30% reduction in the space occupied by this cluster.
- Optimal positioning of ER/ICU to lab, ultrasound and x-ray: Saved 96 seconds, 124 seconds and 70 seconds respectively per patient and accompanying providers.
- Co-locating the fast cycle time full blood count within the blood draw/specimen collection area: All travel of collected or drawn specimen was eliminated. This resulted in a 484 hour saving of a provider/support worker's time.

1900050 QE II MASTER PLAN

Future Trends in Medical Equipment Related Systems and its Impact on Healthcare Infrastructure

Submitted on March 31, 2017
Insight Health Tech Planning Team
Peter Wegener – Executive Lead, Financial, ICAT
AbdulSalam Jaber – Executive Lead Technical
James Moolecherry – Project Lead, ICAT, Equipment Integration

Table of Contents

Unit 23 – 5484 Tomken Rd. Mississauga, ON L4W 2Z6
Tel.: 1(289) 814-0314| **E-Mail:** info@insight-htp.com | www.insight-htp.com

1. Introduction

The purpose of this report is to introduce the reader to the medical equipment trends, to look forward, and share information on the new advancements and potential innovations as they relate to medical equipment and information systems. These trends, advancements, and future ideas are one of many influences on an organization's Information Communication and Automation Technology (ICAT) vision, strategy, planning and design. The ICAT strategy also has influence from and to the clinical workflows and the overall building design.

Transformation, process redesign, ICAT, and building design teams have a unique opportunity to work together to realize the value and benefits that can come from transformation, change management, enhanced clinical workflows, patient safety tools and techniques, patient experience focused initiatives, and developing systems that can provide intelligent clinical and administrative analytics.

2. Emerging Trends

2.1. Medical Equipment

Recent advances in medical equipment are being realized in terms of connectivity both internally and externally. These advancements are becoming smarter, enabling mobility, and adding value to patients, physicians, and care team staff.

There is an ever-growing demand for acute beds. Population is growing and people are living longer due to clinical advancements. Clinical tools and techniques have been developed to quickly diagnose, treat, monitor, and stabilize patients. Once stable a patient can be treated in ambulatory settings, such as, in hospital clinics, community care providers, primary care physicians and monitored at home. In order to maintain good care and manage chronic illnesses they and their families are empowered by being provided with equipment that can be monitored and analyzed by care providers. Most of these new in-home technologies are Internet friendly.

Devices are becoming wearable and in some cases digestible. Patients that utilize these technologies are able to live their everyday life while tracking the medical changes that occur during their normal routines. This information can be monitored remotely, stored, analyzed in such a way that a clinician can see patterns that might be caused by a patient's routine or habits.

Patients can be taught how to leverage their smart phones to monitor their medical devices. This data can be collected and monitored by the patient and family members and also collected and reviewed with care providers at their next visit.

Robotics are more common in newly designed pharmacies and laboratories and are being rapidly introduced in surgical suites. Pharmacies have robotic dispensing machines and pill pickers that obtain patient medication information from the Clinical Information System and the robot can pick medications and place them in a bar coded casing for positive patient identification during the medication administration process. Laboratory Analyzers can electronically read a patient identifying bar code that is placed on a specimen, run the diagnostic analysis, produce and post patient specific data into the CIS. In some more advanced hospitals robots have been acquired to deliver linens and supplies to nursing units.

The healthcare industry is seeing new advancements in regular equipment like patient stretchers and beds. A hospital can now select Smart beds that can connect to a network, collect specific data about a patient in the bed and send that data electronically to the CIS. An example is if a patient is identified as a falls risk the bed can monitor the bed through sensors and if the bed senses the patient is about to get up it sends an alert to a nurse who in turn can quickly respond to the patient prior to the patient completely getting out of bed. Some beds can control the bed arms and have them elevate so that the patient does not get out of the bed.

Within a patient room multi-purpose devices can be used to meet multiple stakeholders' needs. Clinicians can access patient information and review care plans with the patients. Patients can access patient portals, discharge instructions, complete dietary orders and surveys. Due to poor planning and design many of the integrated bedside terminal initiatives have failed. This can be prevented by developing a proper vision, integrated planning and designing the configuration and architecture. In addition, the wall supports, brackets, and room layout all need to be incorporated into the design.

Nursing staff are often frustrated by the perceived lack of medical equipment and will often complain about locating the appropriate IV pumps for their respective patients. Through the deployment and use of Real Time Locating Systems (RTLS) equipment can be tracked electronically which enables clinicians to quickly locate equipment.

Another benefit to RTLS is that assets can be managed from a preventative maintenance perspective as well as a financial asset and inventory management perspective. By tracking medical equipment electronically, a biomedical department or service Preventative Maintenance programs and equipment updates are made easier to locate, track, and manage.

As medical equipment is connected to an organization's network the devices can be made virtually accessible and this enables a biomedical engineer to remotely deploy updates, for example, IV pump drug libraries can be disseminated from a central Biomedical Department and all pumps get the update immediately as opposed to locating each one taking it out of service, updating libraries, and then sending it back to the unit.

2.2. Medical Equipment and its Relationship with Clinical Systems

Interoperability is defined by the Health Information Management Systems Society (HIMSS) as "In healthcare, interoperability is the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged." Interoperability is required to achieve a smart healthcare facility and to this end, all systems must be connected and integrated in such a way that information flow and exchange is achieved seamlessly. Selecting the right medical equipment and system technology is not enough to achieve interoperability, the building should have the infrastructure to support it.

Interoperability advancements and standards have been established and are continuously improving so that most medical equipment is now able to effectively integrate with Clinical Information Systems (CIS). Medical equipment is becoming capable of providing real-time feeds of data that can be integrated with a CIS. This is becoming more effective in preventing patients from crossing thresholds that could require them to need more acute intervention. An example is taking real-time automated data feeds from cardiac and vital sign monitors and developing clinical algorithms that monitor the equipment data in conjunction with lab data to alert clinicians of patients that require intervention.

Another benefit that comes from integrating medical equipment with Clinical Systems is that Hospital Nursing staff no longer need to transpose data that they read from the equipment into the patient's electronic record. This electronic process of feeding data directly from the equipment to a CIS saves time and the patient's information is going to be accurately transcribed into the CIS. In addition this data can be reviewed outside the patient room at the nursing station so that a patient can be monitored centrally. This configuration allows communication to be enhanced and faster as nursing is able to electronically send the patient's information to a remote on call physician that historically would need to come on site.

Big data is a term used to describe the collection of a vast amount of data that can be analyzed from an individual patient perspective or from an aggregate, population perspective. Sophisticated tools can acquire data from multiple sources including medical equipment and through the use of business intelligence tools organizations enable their users to develop things like predictive analytics, algorithms, trends, population planning, and supply and demand. Analytics can assist with ensuring initiatives like 'do no harm to patients' by monitoring patient specific data and sending clinical alerts to the care team.

Many systems are providing virtual care which assists with handling capacity and to treat more patients in less time. Virtual care techniques such as electronic consults and virtual visits. As an example, a primary care physician who seek a specialist's opinion can potentially post a question on a secure web based portal and a specialist can respond electronically within a defined timeframe. This can help reduce unnecessary visits to an ER department. Use of Telemedicine is expanding and services are expanding outside the hospital walls to monitor patients at home and remote clinics. Physicians can be provided with diagnostic quality equipment

Newer technology is enabling Clinicians to remotely monitor patients and in some cases even offer remote clinics. In Ontario, the Brampton Civic Hospital (BCH) Psychiatrists are treating Mental Health patients that are located in a rural hospital. This provides the rural hospital with access to physicians that historically didn't have access to without referring the patient to the (BCH) clinic. Patient is seen more quickly and care is provided to a larger population of patients that require this specialized care.

Technology is driving this and physical spaces need to support the use of technology and sharing of info- in a clinic space for instance, does the physical space allow for the physician to share/show information on the screen with the patient and allow for a didactic interaction and eye to eye contact. The care then can be extended outside the walls and adapt telemedicine and remote diagnosis and collaboration. IP based system are systems that are connected to the network and are scalable, uses analytics, housed on a cloud, virtualized and can be:

- accessed remotely,
- transmit and received data remotely
- can be a standalone or part of the server-based network

Another consideration is that the space needs to be designed to protect patient privacy and confidentiality. This is related to placement of equipment and devices so that anyone that is not directly involved in the care team is not in a position to compromise privacy rights.

Patient care teams are transient and not always accessible yet they need real-time view of information and communication. Remote considerations must be taken into account when designing medical equipment connectivity. If it is designed for internal use only it might need to be reconfigured to meet a remote user's requirements.

Use cases can be determined and used as examples of a process of communicating pertinent information to end users from building systems. For example, freezer rooms should be communicating temperature alerts to hospital staff and any potentially managed service provider. A second example of a use case is remote monitoring of OR equipment like lighting. Another is example is electronically sending building related code alerts to the appropriate personnel.

2.3. Wireless and Wired Medical Equipment and systems

Wireless applications in healthcare have taken a huge leap in the last decade. Most equipment has the wireless technology as a standard feature in addition to the wired option. By embracing the wireless option medical devices and systems can send and receive information from anywhere as long as it establishes a network connectivity. This means that, in most cases, a care giver is no longer attached to a specific physical space to perform the required examination because the device is mobile and connects to the network anywhere within the building.

Equipment is becoming more mobile and going to the patient versus the patient going to the equipment. Point of Care equipment is mobile equipment that must remain connected to the network while in transit to retain connectivity to the CIS.

Many different types of medical equipment are mobile. They are no longer stationary and this enables the patient to remain in their room while the equipment comes to them. This helps enhance the patient's experience and clinical workflows as a technician can come to the patient rather than arranging for Portering staff to bring the patient to/from their room. As the equipment becomes more mobile there is a greater need for Wireless bandwidth, responsiveness/performance, and maximized density/coverage.

RTLS systems in a building are being utilized to integrate many clinical systems and take advantage of existing infrastructure. A combined utilization of Wi-Fi, RTLS systems and smart medical devices will result in the development and implementation of a smart workflow. The Smart pump example, shows how the three elements of healthcare facility are interoperable. This model of different systems working together is becoming wide spread and being implemented in almost every business area within a healthcare facility.

Use of Point of Care (PoC) devices is growing. Glucometers are leveraging the connection and providing real time feeds of a patient's blood glucose levels and populating the patient's electronic record. Medication carts are equipped with bar code scanners and computers which enable the closed-loop medication process to be utilized in real time. These med carts are often larger so must be taken into account when designing patient rooms

Patient Safety initiatives are enabled by utilizing closed-loop processes. ECG carts are also utilizing bar code scanners to positively identify patients and their electronic ECG. Again, a room must take into account that an ECG cart will need to make its way around the room so as to access the patient.

Medical equipment must be returned to and from the unit and biomed department and many new hospitals are identifying the need to eliminate the risk of contaminating sterilized equipment. One method is to determine equipment travel pathways for users to follow to ensure dirty equipment does not cross into clean areas.

Wired equipment and systems do provide direct point to point connectivity. This is a reliable connection that does not suffer from interference and is still essential for equipment that must remain available for patient care purposes. Some examples of these types of equipment include Lab Analyzers and Diagnostic Imaging Modalities.

The challenge that comes with wired equipment is that it can be restrictive and lacks the flexibility for expanding or relocating departments, equipment, and systems.

2.4. IP based Medical system

Today, it is estimated that 40% of medical devices in the market are IP addressable, and by the year 2020 it is estimated that the vast majority of medical devices will be IP addressable. Healthcare facilities are facing the challenge of keeping up with the rapidly evolving technologies and the widespread adoption of smart hand held devices. The model of care is evolving and growing to embrace these technologies. IT infrastructure in a project has to be planned in early stages and should be designed to accommodate current and future trends.

To achieve all of that the building and medical equipment and systems must be smart, in other words, the three elements of the healthcare facility - Building, Clinical and Business- should integrate and be interoperable. The data collected should be made available to any sub system within any of the three elements. The requirements to support a smart vision is to be assessed and the infrastructure is to be evaluated. A process has to be put in place to identify:

- The evaluation of current infrastructure and if it is capable to accommodate the new needs. During design, the space has to be designed to be flexible to accommodate different clinical services, number of data drops, and electrical outlets and its distribution have to be done in away that minimizes the need for adding drops, power outlets and other services.
- Identify new needs in infrastructure and coordinate the infrastructure with adjacencies, availability of services to support workflow planning. Technology has made healthcare facilities, external community care center and physician's offices more connected than ever before. This resulted in minimizing the need for most department to be adjacent to each other. An X-Ray can be taken for a patient in the Emergency department, the Radiologist can the review and report remotely. The same goes for clinical laboratory, where PoC devices and the utilization of Pneumatic Tube System (PTS) with minimize the need of departmental adjacencies.
- Develop Equipment and network specifications early in the process to prevent building a status quo technology that results in producing a technologically obsolete building. The network design has to be future proved and scalable, to ensure that it will withstand any future surge capacity and allow for new networkable technologies to be implemented with minimum impact on infrastructure.

Planning the technology level of a building starts in early stages where functional and space programs are to be developed in such a way that supports the clinical vision, workflows, technology trends and a smart facility concept.

Technology and automation levels usually drive the development of Clinical and business workflow in an organization which will result in direct impact on the physical space medical equipment, medical systems, and furniture. Flexible adaptable spaces are needed to accommodate for the surges which are happening with increased frequency and Functional changes over time.

To accomplish this, the designed facility needs to be 'wired' accordingly. With the proper infrastructure implemented in the three elements of the Facility:

1. Clinical: Medical Equipment and medical systems, EMR to name a few must be fully integrated and interoperable.
2. Business: Scheduling, booking, Unified communication system to name a few must integrated and interoperable.
3. Building: Building Automation System (BAS), Nurse Call, and environmental controls to name a few must be integrated and interoperable.

Implementing technologically advanced medical equipment and systems, required planning at an early stage of the project and coordination between the different design teams have to exist to ensure a successful design and implantation of a functioning Digital\smart efficient healthcare facility.

As evidenced by the examples above there is a significant need to design the IT infrastructure to support the ever-growing physician, staff, and patient needs of connecting with medical devices, mobile devices, and the vast number of clinical systems.

3. Technology adaptation

3.1. IT Infrastructure

To successfully adapt an innovative technology, a system's integrators will have to understand and assess the current state of technology in place and the level of automation implemented in the medical equipment and medical systems area. This will allow understanding of the infrastructure in place and what level it is at currently.
Medical equipment is becoming nodes that can reside on the Corporate Local Area Network. Network must be designed to address the need for a large quantity of devices that historically were standalone devices.

The new trends in medical equipment ensure that the equipment can support the availability of information collected from the patients anywhere, and anytime. This requires all the equipment to be integrated and all the data collected to be made usable and available to physicians, caregivers and patients. Mobile wireless devices that rely on the facilities infrastructure and utilize the current systems are becoming and will continue to be in high demand. By adapting the wireless devices, patient population will become more involved in directing/collaborating in their care, rather than the older model of totally physician directed care and control.

Wireless systems, most if not all, utilize the facility's wireless infrastructure, wireless network and Access Points (AP). This will reduce the amount of wires above the ceiling, all the network switches for the wireless system can then reside in the IT closet on a rack outside of the clinical space. This will free more room for clinical usage and ease of access for troubleshooting, upgrades and updates by IT personal and clinical Engineering.
A combined used of Wi-Fi and RTLS enabled medical technologies can dramatically increase the flexibility and increase the availability of the medical devices and systems. The data produced by the devices can then be made available to other systems and utilized to drive decision making or actions using predictive analytic technologies.

Within a facility, when Real Time Locating Systems (RTLS) are implemented, keeping medical devices up to date can't be made easier. For example, an infusion pump requires continuous update to its drug libraries and software, in addition data is usually collected by pharmacy to monitor proper usage of the pumps, drugs and look for near misses to better improve the system. This always been done manually and it took enormous efforts to locate the pumps and then download and upload information as needed. When installing a smart pump, that is tagged with an RF ID tag, the location of the pump will be immediately identified, the data upload and download will be done remotely and the reports, saving time and effort and eventually increasing the efficiency of the workflow.
[Success story: Makenzie Health have implemented RTLS system throughout the facility utilizing a mix of InfraRed, RF and Wi-Fi based technologies. They have been able to deploy multiple successful integration projects, smart staff ID Tags, Equipment RF tagging and wayfinding]

Selecting an appropriate RTLS system is essential as there are different types of systems that utilize different underlying technologies. There are technologies like Infrared, RFID, and triangulation to name a few. Each type of system has its own unique benefits and developing a plan around how the system is to be utilized will enable the organization to select the best system that meets their needs.

[Success story: Humber River Hospital utilized Periop patient tracking system, utilizing Patient RF tags and status display board system. The patient will be tagged, and then assigned a symbol to be easily identified by family and friends without compromising patient information. The family and then monitor the status and the whereabouts of the patient at all times while enjoying a meal or a cup of coffee outside the surgical suite]

The increased use of wireless devices continues to grow at a rapid pace. Organizations must monitor usage and be prepared to increase Wi-Fi density and be ready to adapt to new advancements in the technology.

As the use of wireless grows and patients and visitors request access the organization must develop policies and protocols to stay current with patient needs. In addition, as these types of devices are used by physicians, staff, patients and visitors there is diligence required in enabling all devices to operate as they might cause Wi-Fi and radio signal interference with different types of medical equipment.

Mobile equipment is more vulnerable to theft. Organizations need to address layout of building, device management and tracking, and secure areas through the use of mechanisms like employee card access. This does not eliminate the risk but acts more as a deterrent. Again, it is essential to continuously adopt best electronic and physical security practices.

With the addition of multiple internally and externally managed systems there is a need to plan the design of Virtual LANs. Security best practices will direct an organization into ensuring only the appropriate roles have access to specific systems. An example is that Building Automation Systems might require the ability to share data to and from a Hospital's system and each respective organization would not want the other organization to have access to the transaction system. An Enterprise Service Bus can be utilized as a gateway between the two environments and still enable the real-time flow of the required data between the organizations. These environments can be further protected through the use of firewalls.

3.2. Legacy systems assessment

An inventory of the legacy systems that are in place is essential, an evaluation to establish the technology band and the age of the systems. Furthermore, understanding the level of utilization of these systems in what clinical area they are being used will help to provide a feedback to how to improve and upgrade these systems.

The existing Clinical Information Systems functionality and ability to integrate needs to be analyzed and assessed to ensure they are capable of meeting the long term ICAT vision. Existing Business Intelligence and Analytics' (BIA) systems should also be assessed to ensure they are capable of providing a current view of the operations, predictive view, and the ability to drill into the data for detailed analysis. Often times the (BIA) are implemented with little success because the transaction based systems were built in such a way that data elements are very difficult to extract for inclusion into a credible report and a report that is summarizing inaccurate or incomplete data will lead a decision maker in the wrong direction and this could have severe consequences to the organization. Good reports on the other hand can lead to better clinical process designs, building infrastructure and flow designs, and sophisticated analytics at both the patient and population levels.

Lessons learned from trying to take an older building and trying to make it current. E.g. Cabling was laid across removable ceiling tiles, no conduit, trays or anything to support. Cabling continuously improves CAT 3, 5, 6, 6A, Fibre… historically cables were chopped and not effectively managed for future growth or infrastructure changes. New buildings should manage this better and also be ready for continuously enhancing Wi-Fi capabilities to connect to equipment. Patient related equipment is still more reliable when hard-wired.
Trend is to track and log treatment electronically. Vital sign monitors connecting wirelessly and updating clinical systems in real-time.

3.3. Needs Assessment and Design Considerations

The more technologically advanced systems are utilized in a facility, the higher the load on the IT infrastructure becomes. High availability wired and wireless network have to be in place, redundancies in all systems the makeup the core IT infrastructure have to be in place, i.e. virtualized server farms. The delivery of a smart\digital healthcare facility, depends highly on the designed and installed IT infrastructure installed in the building.

The needs assessment process involves the discussion about adapting new and innovative technologies and reengineering the clinical workflows to a smart workflow where applicable. This will involve recommending:

- Upgrades to the current equipment platforms and
- Upgrading the IT infrastructure to handle Smart workflows, adapting Real Time Locating System (RTLS), Smart RFID cards and patient tracking devices

Physical and technical security of medical equipment. Behind industry norms. Internet access only where required. To protect medical equipment from tampering an analysis needs to be conducted to determine, who and how a user will connect with the device. VLANs can be utilized to prevent Internet access to vulnerable equipment

Privacy legislation is being rapidly being updated and in order to protect information the security must protocols and processes have to keep pace and be in place to ensure equipment remains physically and technically protected from tampering and to enable the Health Information Custodian to protect patients' health information and hospital staff, physicians, and volunteers' personal information.

4. Implementation of Technology

4.1 Workflow design and integrated planning

To achieve the successful implementation and delivery of the functionality expected, given the complex inter-relationships of many stakeholders requires early determination and planning. Workflows that will be used by the Hospital to deliver the services, clinical, administrative and support need to be determined. Based on the needed functionality to support these workflows the equipment specifications and related hospital infrastructure supports can then be designed. Our experience has shown to accomplish this requires that the hospital redevelopment team needs to have the experience and skill sets for all the areas mentioned above to assist the hospital in determining their vision for the use of emerging technologies and see that the teams involved in the planning, design and delivery phases ensure their groups deliver on the vision and take into account the necessary inter-relationships of the groups eg Mechanical, Electrical, IT, Space planning etc.

Without this direction design often moves back to the traditional planning templates. It is also important to maintain the continuity of the Redevelopment Team of the hospital during the life of the project to avoid revisiting decisions and provide continued focus on the vision.

4.2 Procurement

Healthcare providers and Medical equipment manufacturers have always been striving to adapt and implement new technologies. This has always been a challenge as what will be the best approach in protecting the capital investment. As we all know capital dollars are hard to come by in healthcare. The challenge was always when to embrace a new technology and to what level. How to future proof one's investment and ensure it is expandable?

Procurement plays a vital role in the success of implementing a Digital\smart healthcare facility vision, by aligning the specifications of all three elements of the smart building (Clinical, Business and Building) and ensure that the tendering is done in a way that minimizes the risk of not achieving the vision. Often the design of the building and the proper functionality of the medical systems interdepend on each other. Procuring the right technology to suit the design is important and ensures increasing the spaces utilization and increased productivity.

How the equipment will be procured and by which party requires the development of an overall strategy which addresses identification of a risk profile, plan to transfer risk to parties best able to manage it, alignment with a responsibility matrix, opportunities for cost reductions from standardization and vendors' strengths, providing financial stability and certainty, matching of costs with expected outcomes, etc.
There have been many new approaches recently developed for equipment procurement which can achieve many of the objectives outlined. These include Managed equipment services model, dual track negotiations, and alignment of procurement through the builder. Some of these approaches have been successful in transferring risk for some clinical outcomes to equipment providers. These should be explored and the appropriate method should be chosen to achieve the procurement strategy objectives which have been selected by the hospital.

4.3 Compliance

When it comes to implementation of the vision and the intended design, whether its network infrastructure of Medical equipment of systems, it is very important to ensure that the vendor, installer and integrator are complying with delivering the scope of work to achieve the intended vision and design.
The successful implementation of the systems ensures that the designed spaces are functioning properly and efficiently.

4.4 Change management

When a modern technology or business model is introduced several areas will be impacted, processes, systems, organizational structure and job roles to name a few. In each of the cases mentioned above, planning with provisions to accommodate emerging and future trends in Medical equipment and systems and the supporting infrastructure required for proper operation.
Also need communication – all this to address culture change – people, practice, change mgmt. principles as introduce new workflows.
During the duration of any project, changes are common to practices, staff and workflows. Managing the changes plays a crucial factor to the level of success of the project.

By setting a communication protocol to pass the information on to the public and staff who are not directly involved in the planning and delivery of the project is a healthy thing as it preps to accept change when it comes and increases the buy-in.
Older generations are typically less receptive to adapting new technology, and they will always speculate that it will replaces their roles. Early exposure to the type of technologies and testing of new workflows becomes critical in the process of change management of the project.
Change management and the associated culture change required by the adoption of the new technologies and workflows requires early, sustained and consistent messages. Communication should begin as early as possible and message content developed with input from the Hospital Redevelopment Team.

5. Factors to be Considered

Vision, Strategy, Planning and Design. Impact of Transformation. Impact of Workflow Process Analysis and Redesign. Impact on Technology on workflow development. Impact on Building Design. Key to Success: Teams, ownership, innovation, experienced & knowledgeable advisors. Procurement compliance and transfer of risk. Culture of innovation. Constant enhancements

Many factors have been outlined above which arise from the emerging trends in medical equipment.
From our experience the essential factors for consideration to achieve the full functionality of the equipment planned are:

a) Determine a Vision
b) Plan the workflows for delivering service
c) Have a Hospital Redevelopment team to guide the process and align all efforts to achieve the vision.
d) Ensure equipment and project specifications deliver required functionality
e) Ensure the coordination of all groups delivering on the needed functionality and see efforts and outcomes align

6. Value Adds and Benefits

When embracing an innovative design of a facility to achieve a Digital\Smart building, huge benefits can be gained in different areas and throughout the duration of a project till the commissioning and clinical life. The return in investment can be seen in different ways.

Financial

When a building is designed to accommodate emerging and future technologies, the physical IT spaces that accommodate the IT infrastructure required to support the medical equipment and systems move out of the clinical spaces, resulting in better utilization of the clinical space to support clinical workflows. In addition, the IT spaces i.e. server rooms, IT closest will utilize a smaller foot print when the systems reside on a virtual environment and utilize existing IT and Building infrastructure. An example of utilizing the Wireless Network, Wi-Fi, in combination with RTLS to operate and run telemetry system will allow for facility wide coverage, patient and Device tracking, thus reducing the amount of cabling and Access Points (AP's) required if segregated networks are to be installed.

Clinical

The clinical benefits are enormous, when increasing the utilization of technology, nursing stations will shrink on size as the model of care delivery will shift to the point of care when mobile devices are used that are connected to a network and Electronic Medical Records (EMR). The care givers efficiency will increase, as show in a recent project in Ontario where the study showed that by utilizing mobile technologies have reduced the distance the care givers travel each shift significantly, resulting in spending more time caring for the patients.

Telemedicine and telepresence, are other areas when implanted it impacted the clinical and building elements, where a patient in rural areas can have access to a specialist without the need to travel. This will impact the waiting areas, exam rooms and other facilities in addition to having to care for an extra patient and setter in the building wen not implemented.

Patient experience

When IP based and connected medical equipment and devices are installed and used a patient can continue being monitored outside the boundaries of the facility, the stay of the patient in the hospital will be reduced and a care giver will be able to monitor a patient while they are recovering in their homes. The utilization of similar technology, will allow caregivers and attending physicians to receive a feedback on the discharged patient without having them stay and occupy an inpatient bed.

Toronto General Hospital (TGH)

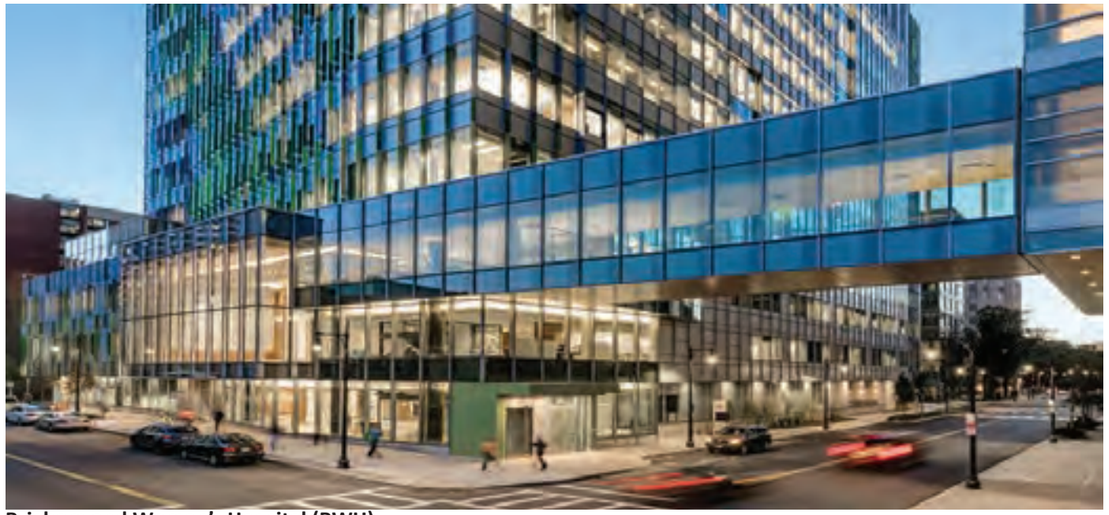
Toronto General Hospital is a 1,980,000-square foot hospital located in Toronto, Canada. The hospital is a part of the University Health Network (UHN), and is leading the way in cardiac care, organ transplants, and the treatment of complex patient needs. The Toronto General Hospital Research Institute (TGHRI) is the research arm of the hospital that reflects and supports the medical programs of the hospital. TGHRI is a leader in innovative biomedical research: its research discovered insulin, created the first cardiac pacemaker, and developed new lung repair techniques, among many other novel approaches.

Johns Hopkins Hospital

Johns Hopkins Hospital is a 1,600,000-square foot hospital located in Baltimore, United States. The hospital is a part of Johns Hopkins Medicine (JHM) - an $8 billion global health enterprise, and one of the leading health care systems in the United States. JHM educates medical students, scientists, health care professionals and the public; conducts biomedical research; and provides patient-centered medicine to prevent, diagnose, and treat human illness. The hospital's featured specialties include gynecology and obstetrics, neurology and neurosurgery, orthopedics, and cardiology.

1.0 Introduction

1.11. Benchmark Projects



Brigham and Women's Hospital (BWH)

Brigham and Women's Hospital is a 775,000-square foot hospital located in Boston, United States. BWH is a major teaching hospital of Harvard Medical School, and is an international leader in many areas, including cancer, cardiology and heart surgery, gynecology, neurology and neurosurgery, orthopedics, and rheumatology. The BWH Research Institute is one of the most powerful biomedical research institutes in the world and the second largest recipient of National Institutes of Health (NIH) funding among independent hospitals in the United States.

Khoo Teck Puat Hospital (KTPH)

Khoo Teck Puat Hospital is a 375,000-square foot hospital located in Yishun, Singapore. The hospital is a part of Alexandra Health System, and since its opening in 2010, has received numerous awards for its green and energy efficient design. KTPH is a 590-bed general and acute care hospital with 38 specialist clinics, eight operating theatres, four endoscopy suites, two intensive care cum high dependency units and rehabilitation gyms.

Centre Hospitalier de l'Université de Montréal (CHUM)

The CHUM is a 2,880,000-square foot hospital located in Montreal, Canada. The CHUM is internationally recognized for its academic medicine and research, with its health research centre (CRCHUM) being the largest in the university network. The hospital is currently under construction, merging three hospitals near each other into one site. The entire project is scheduled to be completed in 2019, and is expected to achieve LEED Silver certification. The new CHUM will include 772 beds, 39 operating rooms, a cancer centre, a research centre and an educational simulation centre.

2

Site Context

2.1 Halifax

The Halifax Citadel

Halifax Waterfront

Halifax City Hall

Halifax Central Library

2.2 History of Buildings

The earliest buildings on the HI and VG sites were constructed in 1942 (Victoria Building), 1949 (Bethune Building) and 1967 (Centennial Building). While there is an urgency to demolish the Victoria and Centennial Buildings due to building failures and aging infrastructure, it is also important to take into consideration the condition of all the other buildings on both sites as they continue to age, and its long-term suitability/ viability to continue providing health care services to patients that meet current and/or future standards. This is important to developing a master plan that is robust and maximizes opportunity for future flexibility and growth, and creating a growth pattern on the sites that responds to the existing building conditions.

Refer to Section 4.1 for further information on the Building Conditions Assessments.

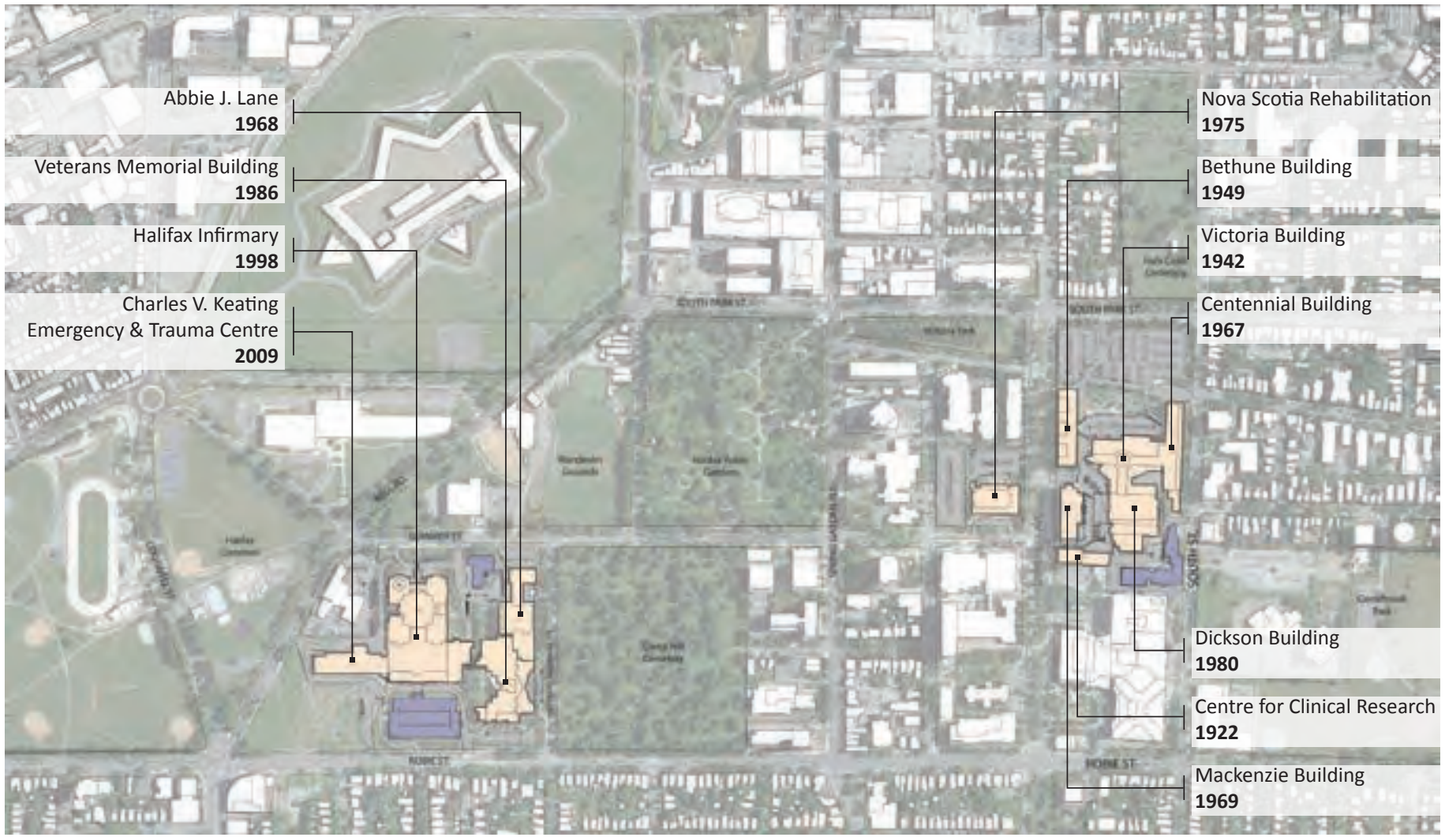


Fig. 201 Aerial Site Plan

2.3 Halifax Infirmary (HI) Site

2.3.1. Site

Fig. 202 HI Key Plan

The Halifax Infirmary site is located within the Halifax Commons, a major urban park in downtown Halifax (refer to Urban Context for more information). The Central Common is located to the north of the HI site, while the Nova Scotia Museum and Wanderer Ground is located to the east. To the south of the HI site is the Camp Hill Cemetery, and a residential neighborhood consisting mainly of single family houses is located to the west. Directly adjacent to the HI Site at the northeast corner is the CBC building.

The Halifax Infirmary site is 21.5 acres in size. There is a significant grade difference on the site, with the highest point along Robie Street sloping to the east towards Summer Street. Because of this grade difference, the entrance to the Halifax Infirmary Building from Robie Street is located on Level 4, while the entrance from Summer Street is located on Level 1.

A community garden is located at the northeast corner of the site. If development is proposed for this location, the community garden should be relocated elsewhere. Adjacent to the community garden is a multi-storey parkade, accessed from Robie Street. The parking structure blocks the view of the main entrance to the Halifax Infirmary Building from the street.

The following buildings are located at this site:

- Halifax Infirmary
- Veterans Memorial Building
- Abbie J. Lane Building
- Charles V. Keating Emergency & Trauma Centre
- Camp Hill Power Plant

View from Halifax Citadel National Historic Site

Entrance view from Summer Street

Corner view from intersection of Robie Street and Veterans Memorial Lane

2.3 Halifax Infirmary (HI) Site

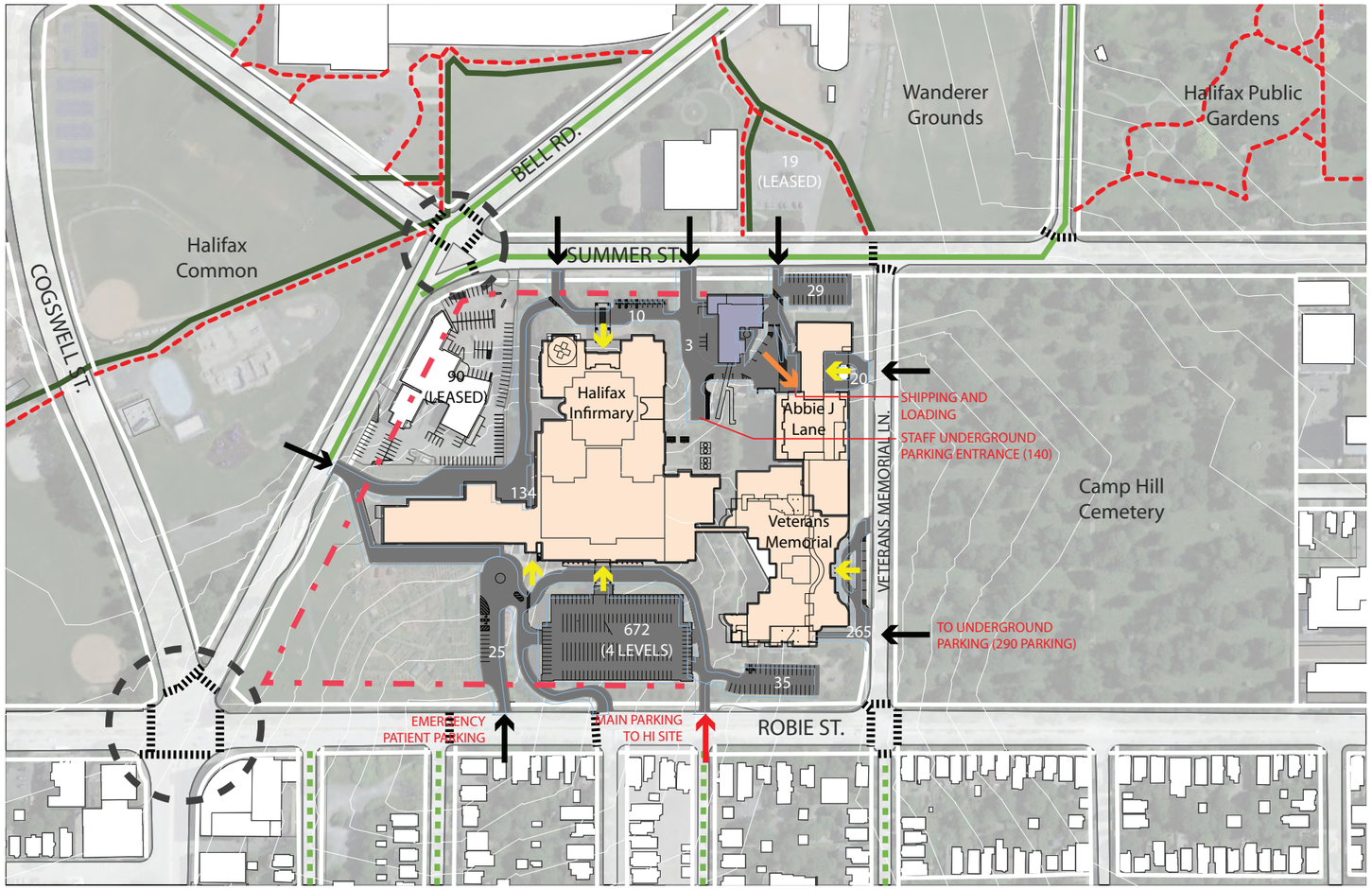
2.3.2. Roads & Parking

The HI site is bound by Bell Road to the north, Summer Street to the east, Veterans Memorial Lane to the south, and Robie Street to the west. Currently, the intersections at Robie St. and Bell Road, and Bell Road and Summer Street are signalized. However, Halifax Regional Municipality (HRM) has completed traffic studies to convert these two intersections into rotaries to help alleviate traffic volumes. As well, a proposed road widening of Bell Rd between Robie St. and Summer Street to include an additional lane of traffic, a bike lane, sidewalk and green space is also being considered.

The main vehicular access to the site for patients and visitors is from Robie Street where patients/ visitors can be dropped off at the Halifax Infirmary Building entrance or vehicles can access the main parking structure for the site. A secondary drop off/ pick up area is located at the Summer Street Entrance. This vehicular entrance is also used by the shuttle bus between the HI and VG sites. Vehicular access to the Emergency Department is located on Robie Street, while ambulances have a dedicated entrance from Bell Street. The Veterans Memorial Building and the Abbie J. Lane Building also have their own dedicated parking.

Staff parking is provided on site as well as across the street at the Nova Scotia Museum. Limited free on-street parking is also available.

Access to the main loading dock is from Summer Street. Trucks must manoeuvre past the Central Plant and back into the dock located at the Abbie Lane Building. Further, the loading access road from Summer Street is also shared by vehicles leaving the drop off area at Summer Street, posing a safety concern and potential traffic conflicts on site.



TOTAL PARKING COUNT ON HI SITE:

122 PARKING (SURFACE)
1071 PARKING (STRUCTURE)
109 PARKING (LEASED)

1302 PARKING

Fig. 203 HI Roads and Parking

2.3 Halifax Infirmary (HI) Site

2.3.3. Pedestrian Circulation & Public Transportation

As the HI site is located in the Halifax Commons, it is well served and easily accessible and connected through a network of pedestrian paths. The master plan should consider how future development will maintain and enhance the pedestrian connections through the hospital site to the surrounding parkland.

The HI site is also well served by public transit routes, with a number of bus stops located with convenient access to the hospital.

Fig. 204 HI Pedestrian Circulation

The diagram on this page illustrates the walking distances within the buildings of the HI site and the number of floor changes that patients, visitors and staff must manoeuvre through to get from the main parking garage to the main entrances to the buildings. A key factor that influences the patient experience and the length of time it takes to move through the building is wayfinding. Unclear wayfinding strategies leads to patient and visitor frustration and confusion, and can add significant additional time to get from point A to point B.
A clear wayfinding strategy must be incorporated into the site and building planning concepts.

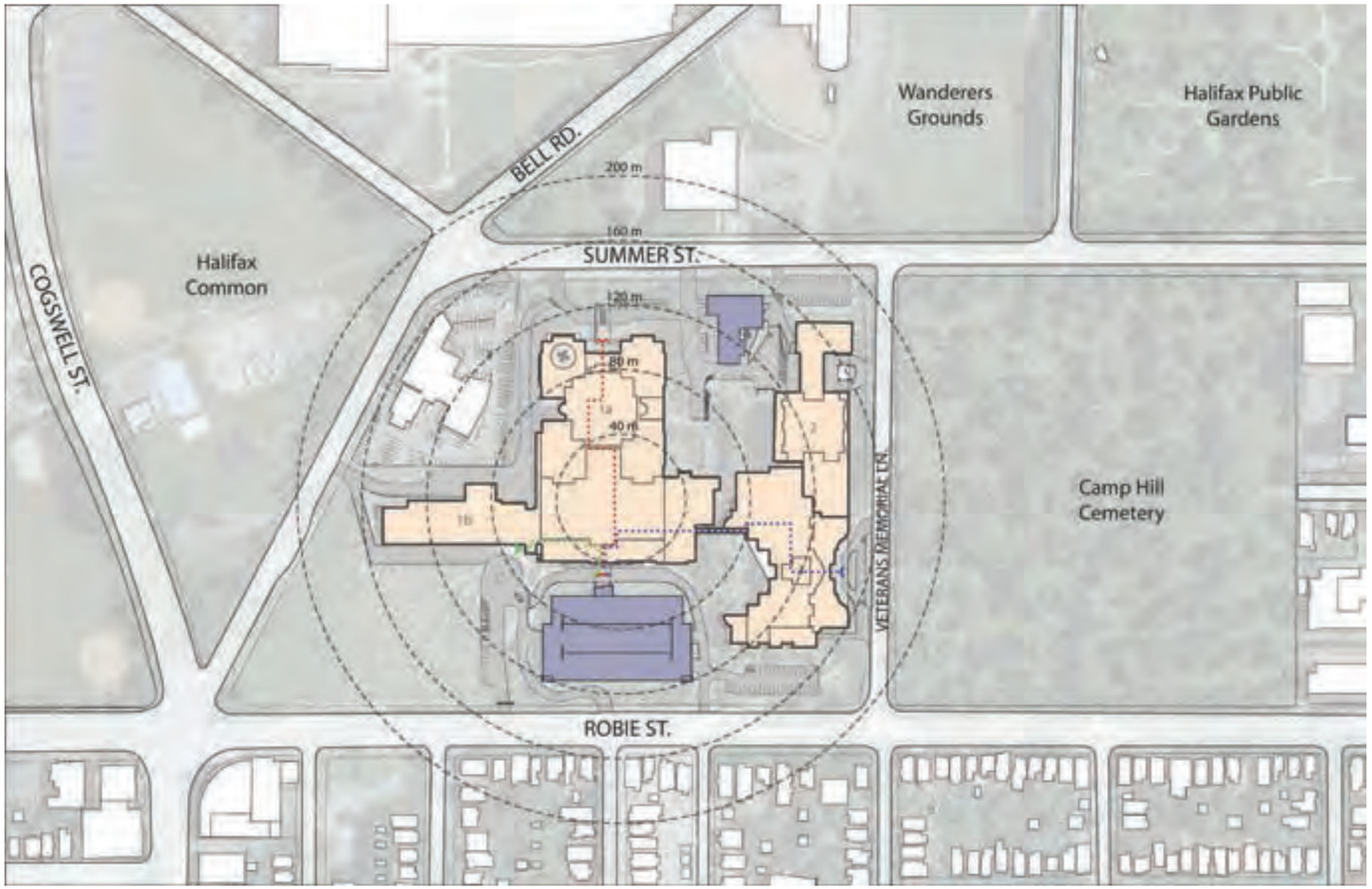


Fig. 205 HI Circulation

2.3 Halifax Infirmary (HI) Site

2.3.5. Existing Green/ Open Space

While the HI site is surrounded by public green space and parks, there is little green space on the site for use by patients and staff. As part of the MOU between NSHA and HRM, there are setbacks required along Robie Street, Bell Road and Summer Street as part of the redevelopment of this site. The master plan must maximize opportunities for green space within the site that can be used by patients and staff to promote healing and well-being. Views to nature from patient spaces in the building is also an important consideration for future development.

Fig. 206 HI Green Open Space

The diagram illustrates the current allowable building heights allowed on the HI site as defined by HRM. Certain areas on the HI site do not have a maximum height allowance and will require further discussion with HRM as the master plan develops. Building heights shall be considered along with building density, green space and environmental factors. The intent is that the site shall be developed to promote health and wellness and shall consider urban context and scale, while maximizing opportunity for development and growth.

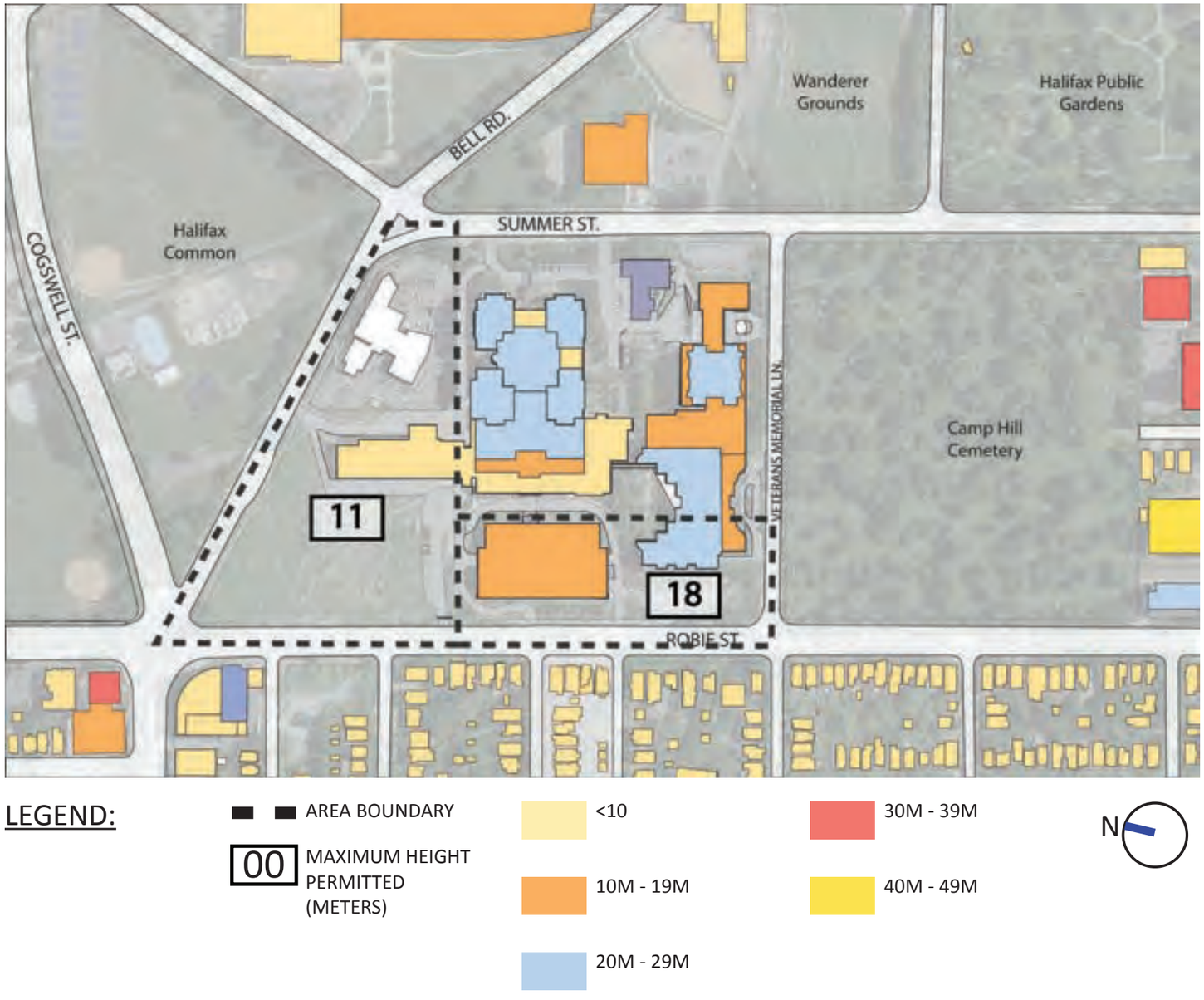


Fig. 207 HI Height Map

2.4 Victoria General (VG) Site

2.4.1. Site

Fig. 208 VG Key Plan

The VG site is located at the south end of the Halifax Common. The IWK Health Centre is located to the west. Dalhousie University, NSHA Rehabilitation Centre, a 4 storey commercial/ residential building and Victoria Park are located to the north. A residential neighbourhood consisting of single family houses and mid-rise residential buildings are located to the east and south. With the proximity of the site to Dalhousie University campus, there is a great opportunity for expanded partnerships in research on this site.

The VG site is 16.75 acres in size and slopes from west to east.

The following buildings are located at this site:

- Victoria Building
- Centennial Building
- Bethune Building
- Dickson Building
- Centre for Clinical Research
- Mackenzie Building
- Nova Scotia Rehabilitation Building

Looking west at Victoria Building

Looking north at Mackenzie Building

Looking north at Bethune Building

2.4 Victoria General (VG) Site

2.4.2. Roads and Parking

The VG site is bounded by University Ave. to the north, South Park Street to the east and South Street to the south.

The main vehicular access to the site is accessed from South Park Street to the drop off area at the Centennial Building or to the main visitor parking lot located at the south end of the VG site. Other vehicular access points to the site are from the intersection of University Avenue and Summer Street (for access to the Dickson Building and Centre for Clinical Research), and another entrance one block east.

Staff parking at the VG site is shared with the visitor parking and therefore there is a shortage of parking spaces available on this site.

There are two loading areas on the VG site and both are accessed from South Street. One loading area is located at the east end of the Victoria Building, while the second is located at the southwest end of the Centennial Building.

TOTAL PARKING COUNT ON VG SITE:	749 PARKING
OFF-SITE SUPPLY PARKING:	170 PARKING
	919PARKING

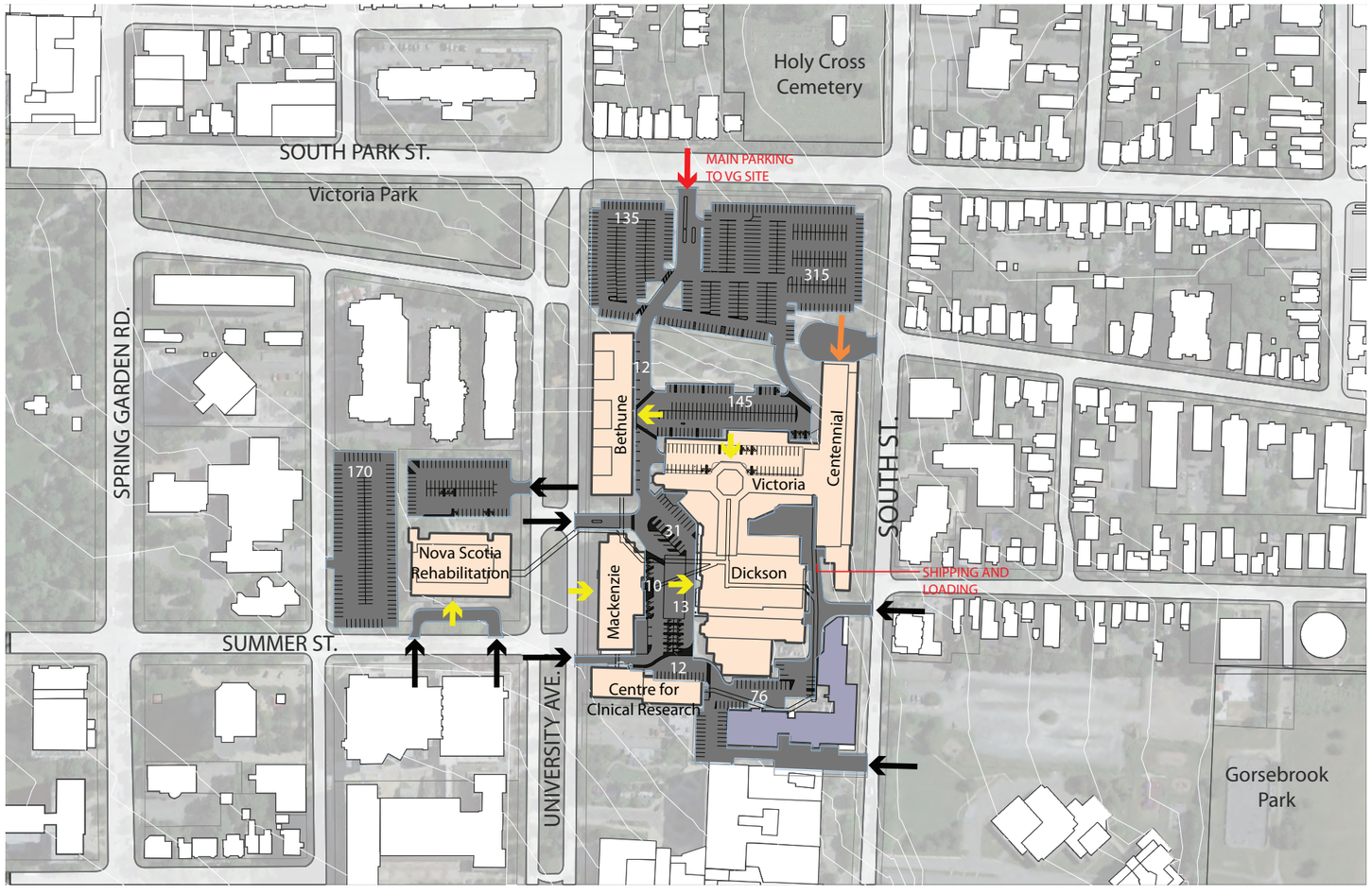


Fig. 209 VG Roads and Parking

2.4 Victoria General (VG) Site

2.4.3. Pedestrian Circulation & Public Transportation

Victoria General is located at the south end of the Halifax Commons. It is mostly surrounded by residentials. The site can be easily accessed by sidewalks from residentials and footpaths from nearby green and open spaces. The site is also supported by multiple bus routes.

The master plan should maintain site permeability to allow for connection to the Victoria General site's surrounding pedestrian routes and nodes.

Fig. 210 VG Pedestrian Circulation

2.4 Victoria General (VG) Site

2.4.4. On-Site Circulation

The diagram on this page illustrates the walking distances within the buildings of the VG site and the number of floor changes that patients, visitors and staff must manoeuvre through to get from one building to another.

Similar to Halifax Infirmary Site, the Victoria General site struggles with unclear wayfinding strategies that confuse and frustrate patients and visitors. This confusion could potentially delay the travel time to get from one place to another. Therefore, a clear wayfinding strategy must be incorporated into the site and building planning concepts.

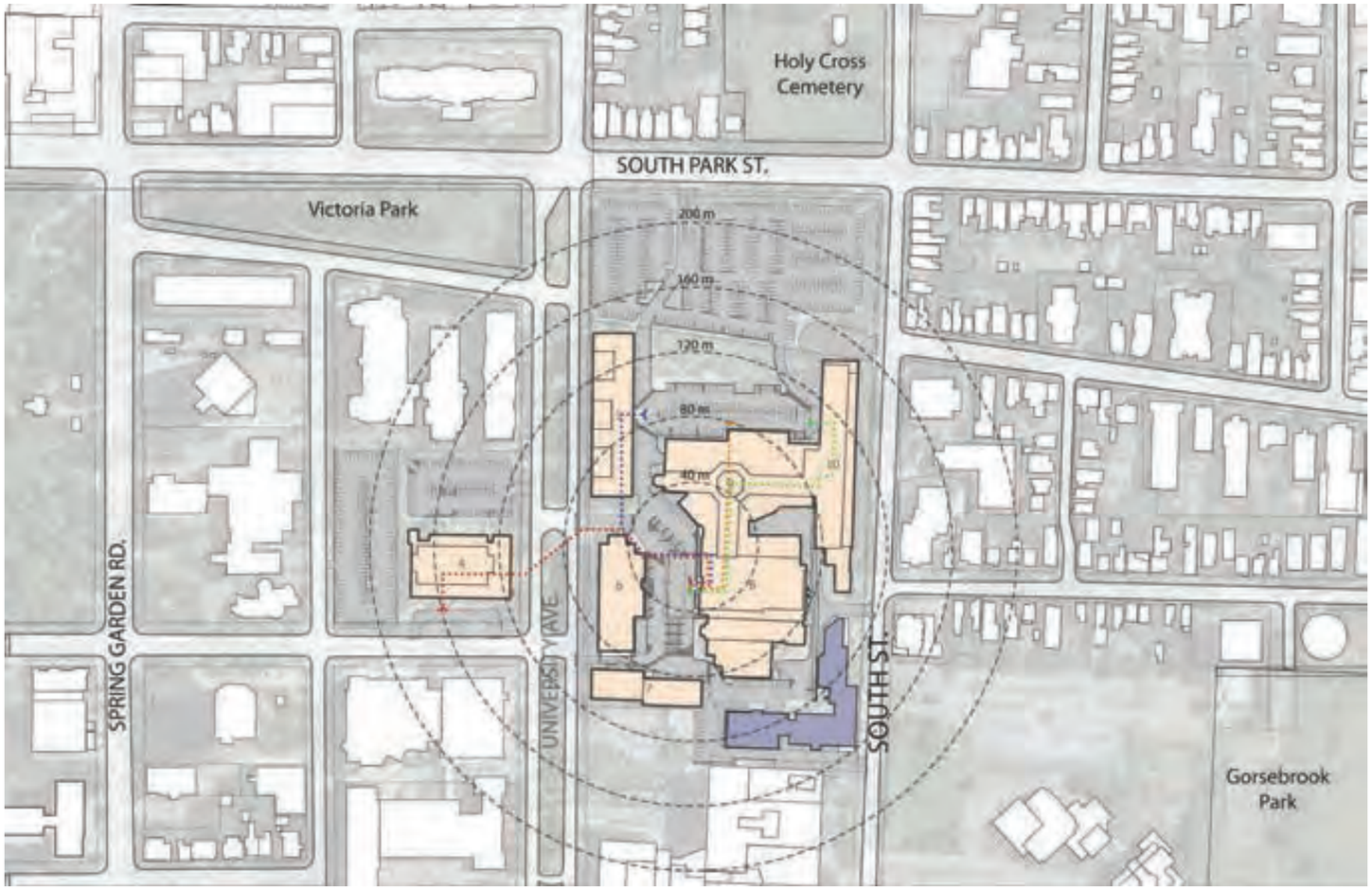


Fig. 211 VG Circulation

2.4 Victoria General (VG) Site

2.4.5. Height Map

The diagram illustrates the current allowable building heights allowed on the VG site as defined by HRM. Building heights shall be considered along with building density, green space and environmental factors. The intent is that the site shall be developed to promote health and wellness and shall consider urban context and scale, while maximizing opportunity for development and growth.

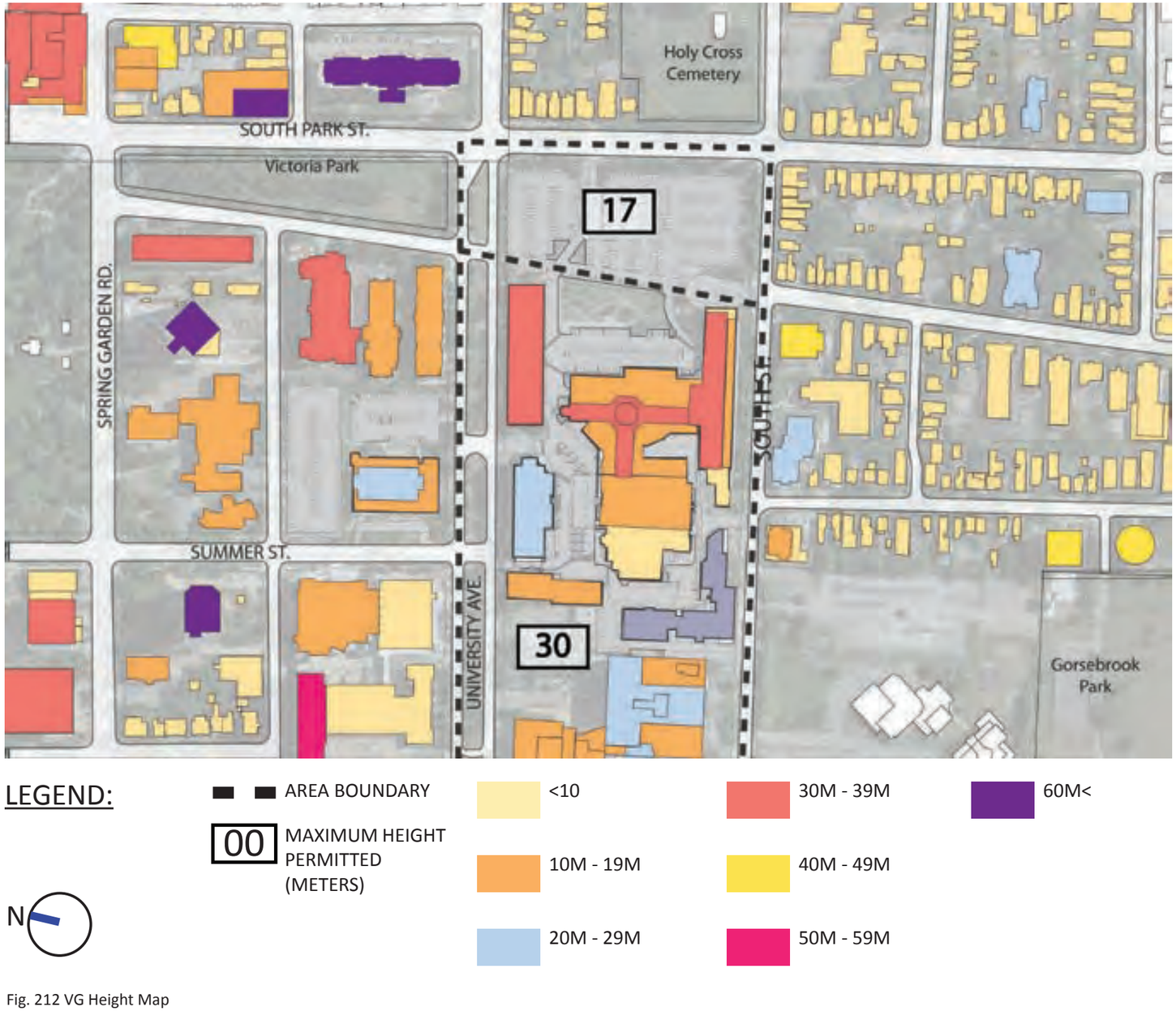


Fig. 212 VG Height Map

2.4 Victoria General (VG) Site

2.4.6. Green/ Open Space

South Park Street, located on the east end of the Victoria General Site, is part of an important spine, active transportation route, and “grand allée” of peninsular Halifax. The master planning of VG will take into consideration the improvement of the urban design and pedestrian realm along the “grand allée” by extending the green space from Victoria Park to the existing VG parking lot.

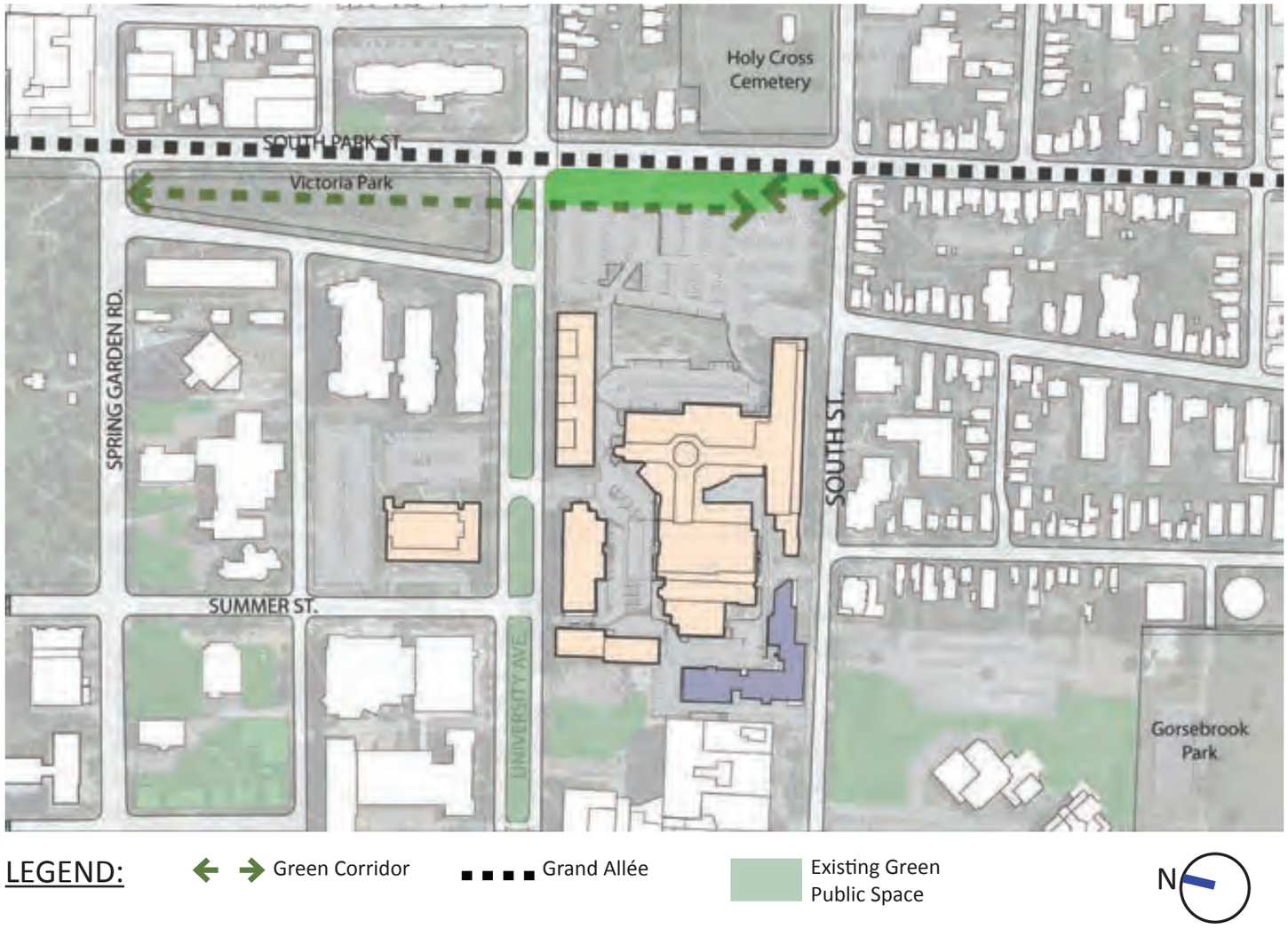


Fig. 213 VG Green Open Space

2.5 Site Overview

2.5.1. Climate

Human comfort and the creation of healing environments will be an important consideration for how and where buildings are located and oriented on the site. Using the information from wind, sun and shadow studies will ensure that the master plan is developed to create an optiman environment for patients, visitors and staff both within the buildings and throughout the site.

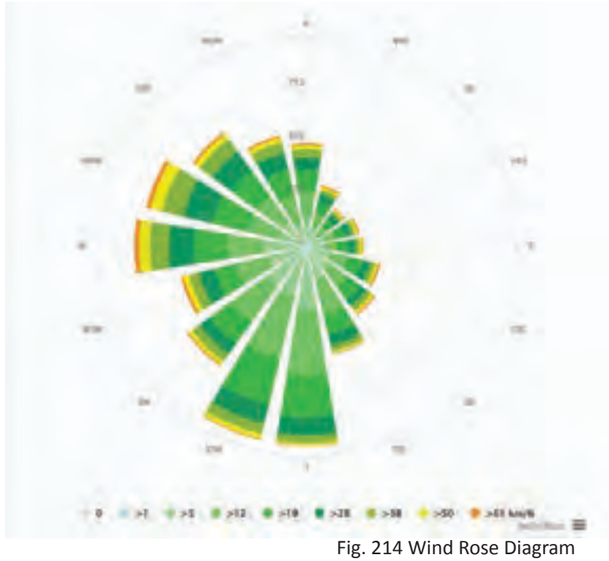


Fig. 214 Wind Rose Diagram

Source: www.meteoblue.com

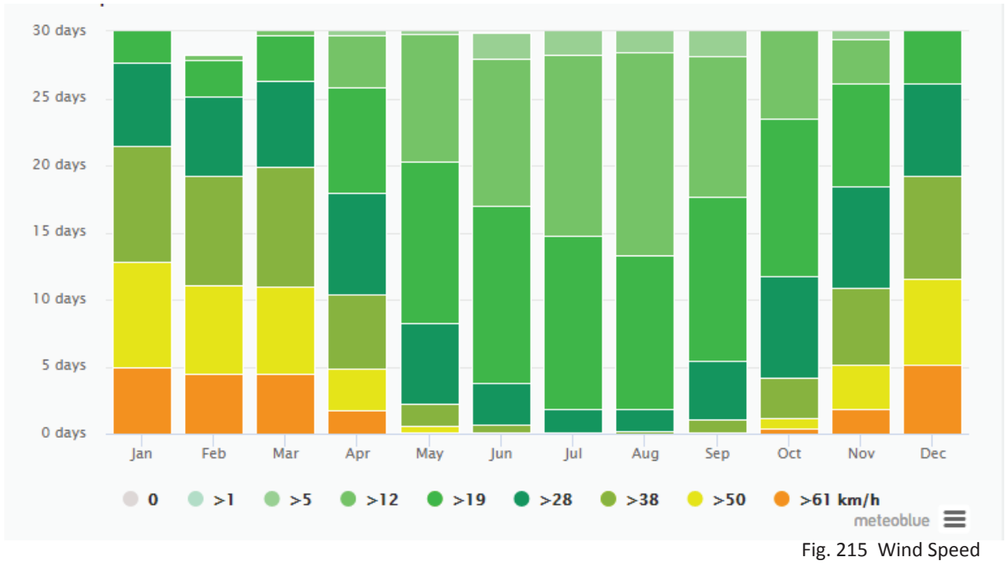


Fig. 215 Wind Speed

Source: www.meteoblue.com

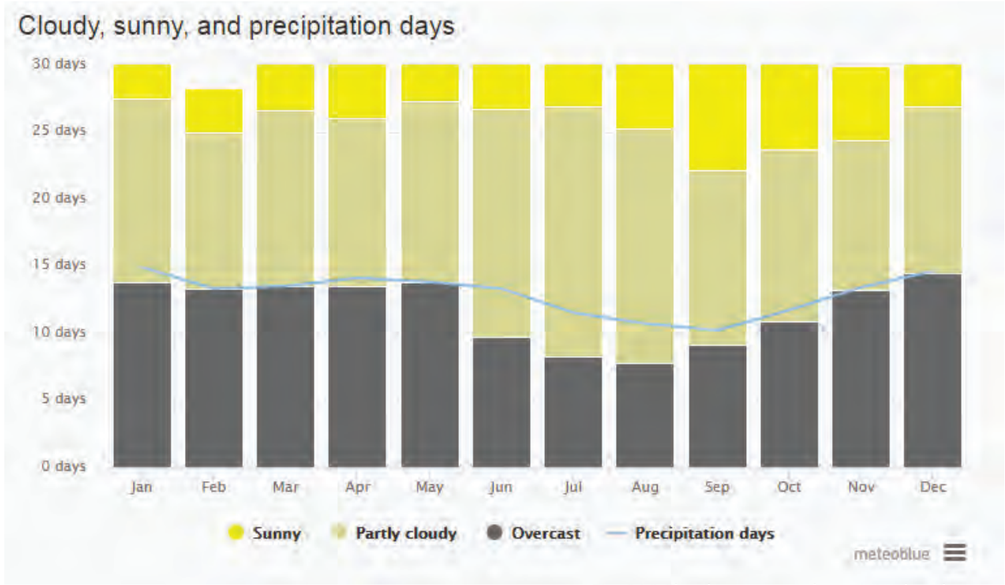


Fig. 216 Cloudy, sunny and precipitation days

Source: www.meteoblue.com

kasian

2.5 Site Overview

2.5.2. Halifax Infirmary (HI) Site - Sun Study

Fig. 217 Mar/ Sept 21 - 09:00

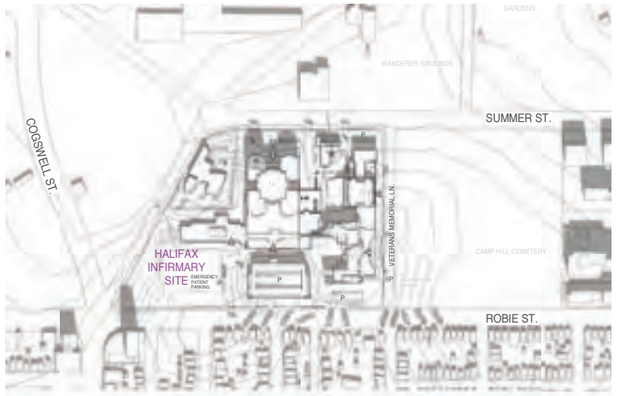


Fig. 218 Mar/ Sept 21 - 12:00

Fig. 219 Mar/ Sept 21 - 15:00

Fig. 220 Jun 21 - 09:00

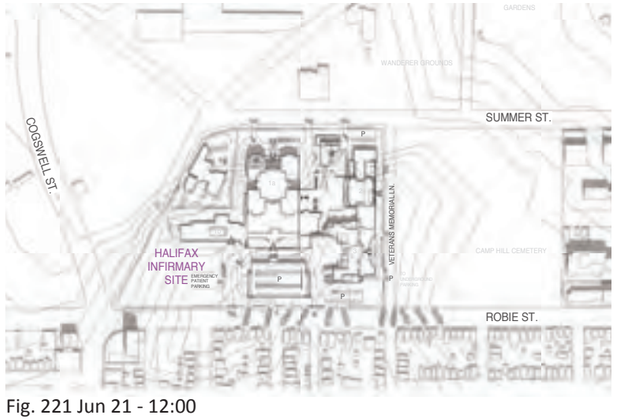


Fig. 221 Jun 21 - 12:00

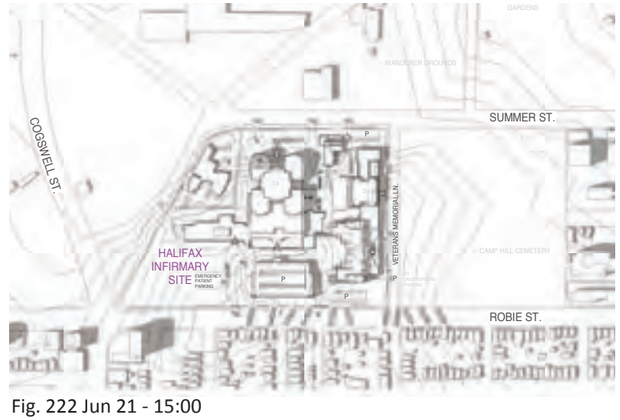


Fig. 222 Jun 21 - 15:00

Fig. 223 Dec 21 - 09:00

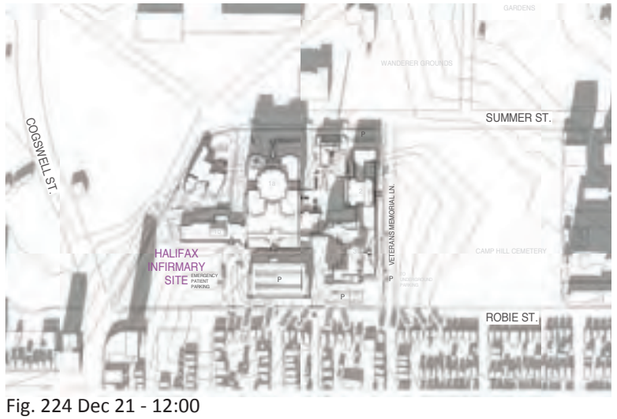


Fig. 224 Dec 21 - 12:00

Fig. 225 Dec 21 - 15:00

2.5 Site Overview

2.5.3. Victoria General (VG) Site - Sun Study

Fig. 226 Mar/ Sept 21 - 09:00

Fig. 227 Mar/ Sept 21 - 12:00

Fig. 228 Mar/ Sept 21 - 15:00

Fig. 229 Jun 21 - 09:00

Fig. 230 Jun 21 - 12:00

Fig. 231 Jun 21 - 15:00

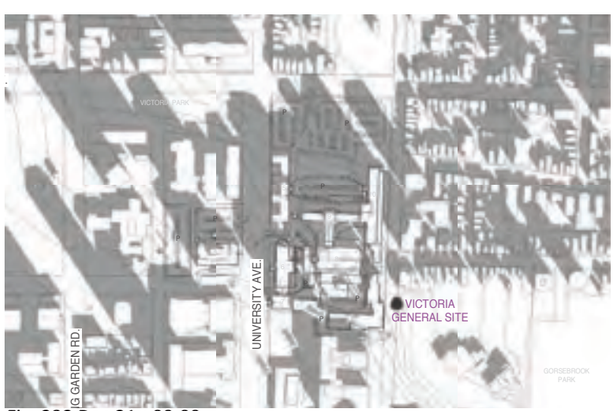


Fig. 232 Dec 21 - 09:00

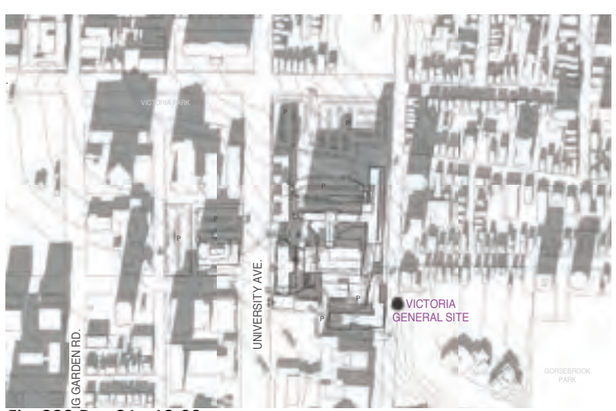


Fig. 233 Dec 21 - 12:00

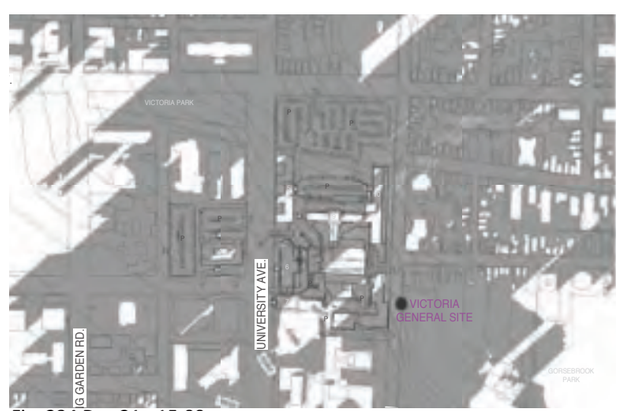


Fig. 234 Dec 21 - 15:00

N

kasian

- **Mutual Planning**
  - **Involvement and collaboration with HRM on master planning and redevelopment of CDHA sites on the Halifax Common.**
  - **CDHA to be included as major stakeholder in HRM's Halifax Common Planning exercise.**

- **Provision of Health Promotion and Care for Benefit of HRM**
  - **Redevelopment of the site is for the purpose of the provision of promoting and improving the health and healthcare of our communities.**
  - **The redevelopment must meet the principles and requirements of that purpose.**

- **Good Urban Planning/ Urbanity**
  - **Must pursue good urban planning, quality architecture, sensitivity to surrounding neighbourhoods, support for the public realm, support for pedestrian-sensitive design, and strong landscape architecture for the Victoria General and Queen Elizabeth High School site to strengthen the Halifax Common as a distinct and special district.**

- **Green Corridor**
  - **Securing a green corridor through the Halifax Common by promoting the extension of Victoria Park via the former School for the Blind. (Currently in VG parking lot).**

- **Pedestrian Realm**
  - **Ensure high quality pedestrian realm and to align with the Halifax Common campus concept, principles of the HRM Regional Plan and HRM by Design.**
  - **Encourage active transportation between Victoria General and Halifax Infirmary sites.**

- **Porosity**
  - **Ensure the public has a high level of quality access through the Common and hospital sites to adjacent neighbourhoods and destination.**

- **Site Use**
  - **Upon approval, CDHA will begin demolition of the QEH building within one year, and the site will not be used for surface parking**
  - **Primary future use will be for public hospital and health care.**

- **Respect for Halifax Common Plan**
  - **Respect for policies outline in the Halifax Common Plan**

Reference document: "Memorandum of Understanding ("MOU") among Halifax Regional Municipality ("HRM") and Capital District Health Authority ("CDHA")".

2.5 Site Overview

2.5.5. Halifax Common Study Area

Halifax Common Skate Park

Halifax Common Playground

Halifax Citadel

Halifax Common Skate Park

Fig. 235 Halifax Common Study Area - Halifax Common Background Report, 1992

N

2.5 Site Overview

2.5.6. Zoning

LEGEND:

- AREA BOUNDARY
- SOUTH END AREA (DISTRICT 2)
- DISTRICT NUMBER
- PENINSULA CENTRE AREA
- CAMP HILL SUB-AREA

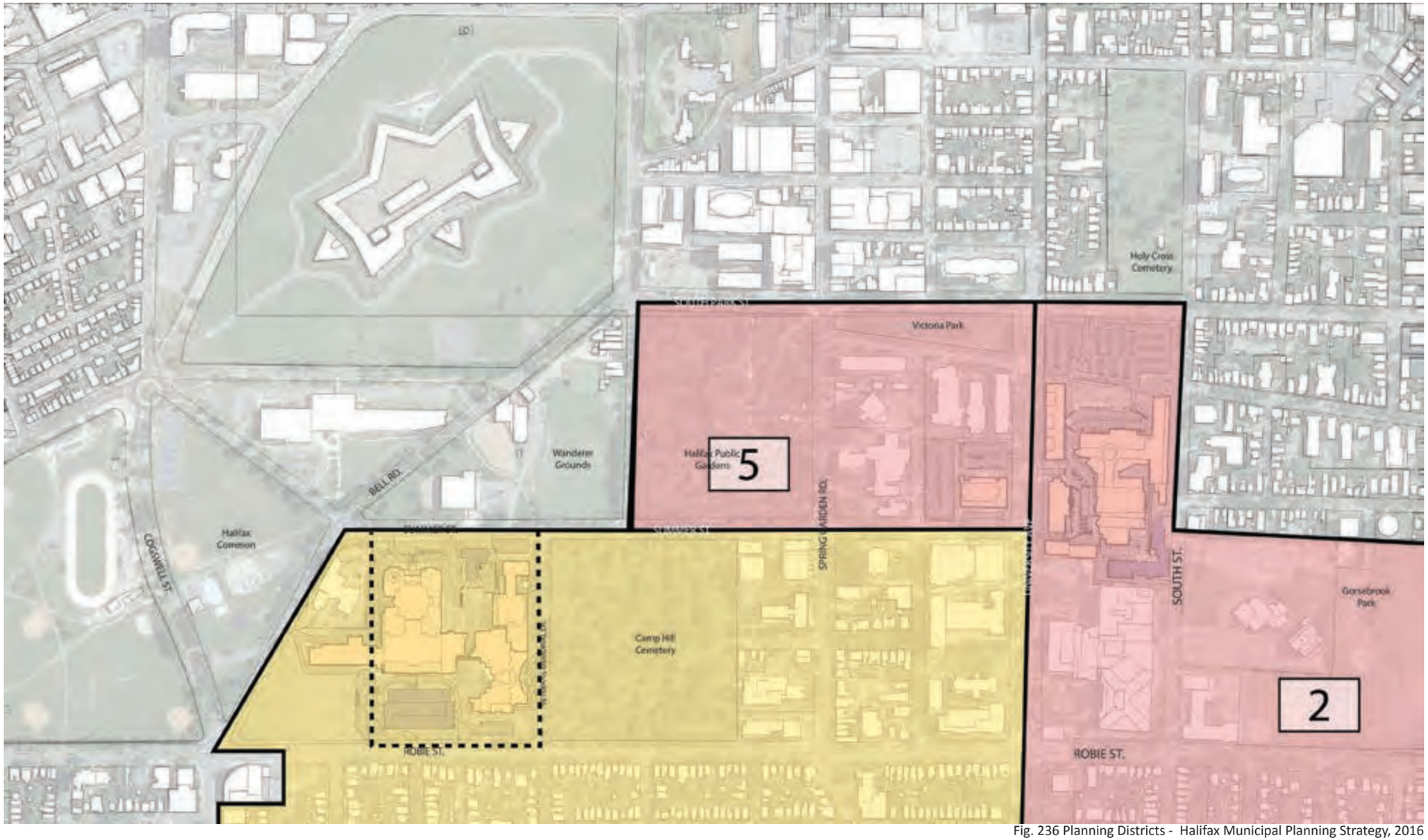


Fig. 236 Planning Districts - Halifax Municipal Planning Strategy, 2016

N

kasian

LEGEND:

- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- RESIDENTIAL - COMMERCIAL MIX
- COMMERCIAL
- UNIVERSITY
- INSTITUTIONAL
- COMMUNITY FACILITIES

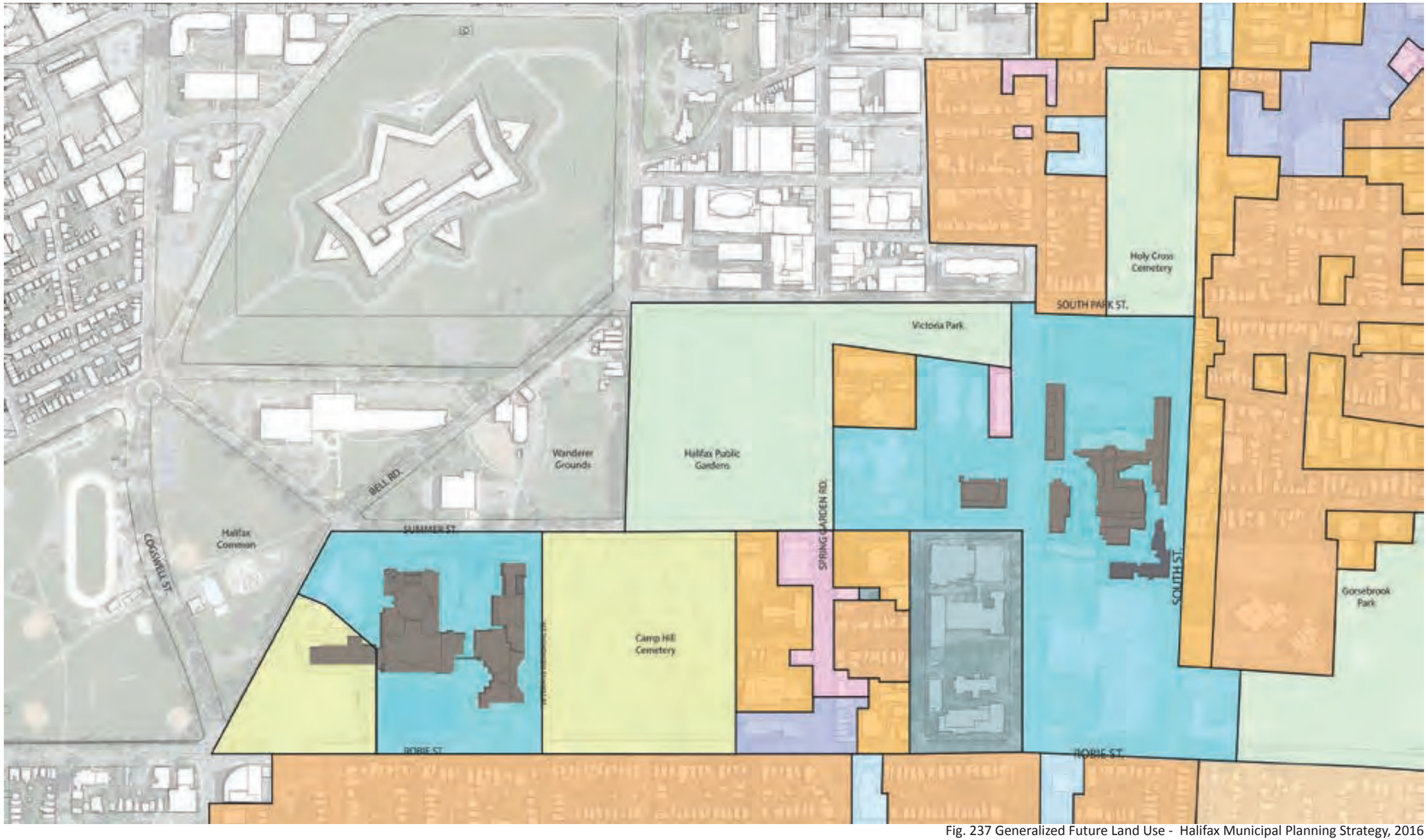


Fig. 237 Generalized Future Land Use - Halifax Municipal Planning Strategy, 2016

N

2.5 Site Overview

2.5.8. Site Wide Travel Time

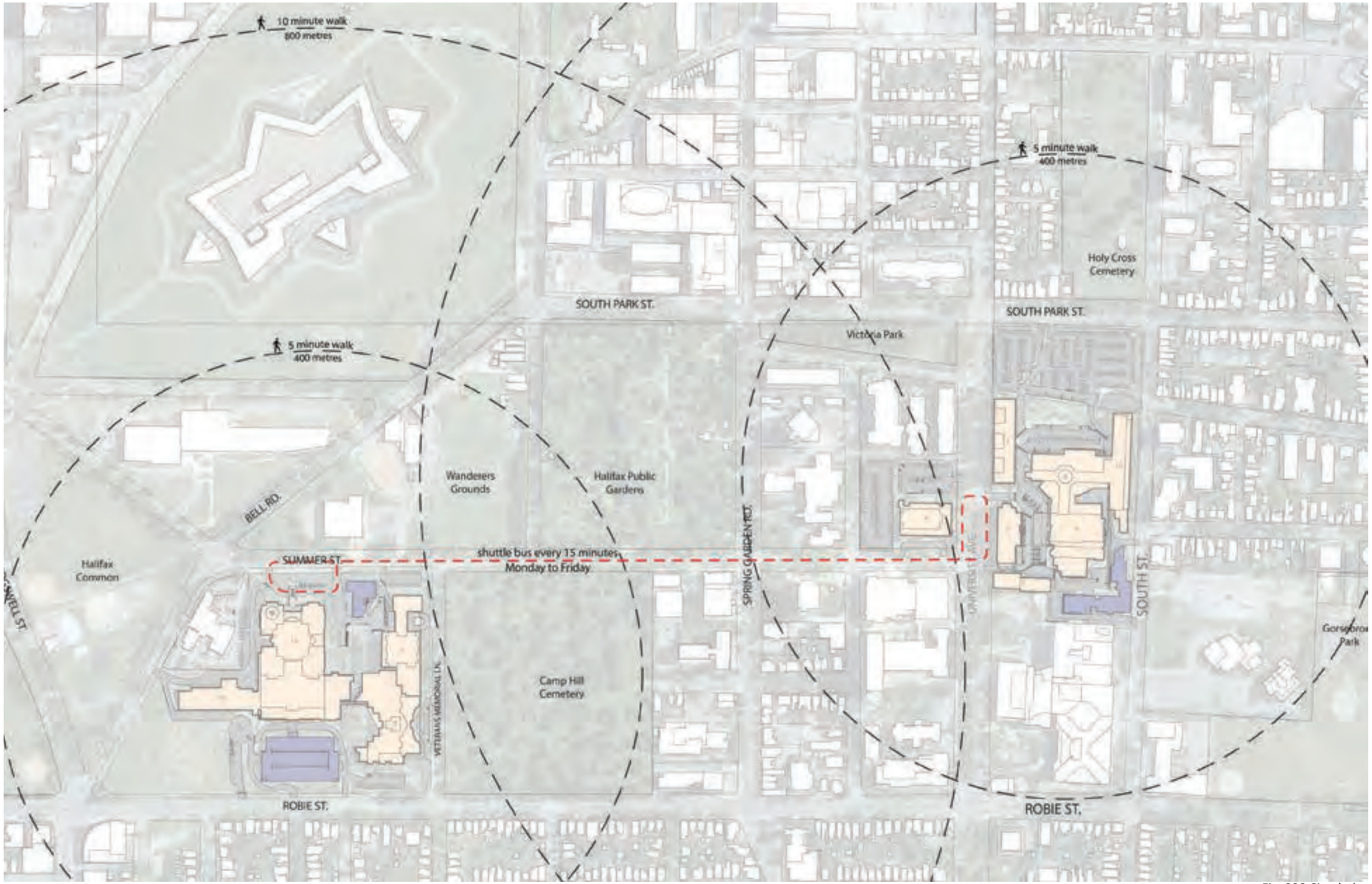


Fig. 238 Circulation

kasian

3

Site Analysis

3.1 Halifax Infirmary (HI) Site

3.1.1. Halifax Infirmary Site Constraints

1. **Robie Street widening.** Robie Street may be widened in the near future, encroaching along the western side of the Halifax Infirmary site. The widening of this right-of-way will reduce the developable area of the site as well as impact required setbacks.

2. **Confusing main entrance.** The Halifax Infirmary has two entrances. The Eastern entrance was initially designed as the main entrance, however with the addition of the parking structure on the west of the site that entrance is now used more prominently.

3. **Parking structure along Robie Street.** The parking structure along Robie Street not only impacts the entrance as identified above, it also blocks the frontage of the building. The space is not used optimally and could be a site for future intensification.

4. **Auxiliary central plant or expansion of existing CH Power Plant.** An auxiliary plant or an expansion of the existing central plant would need to be developed to address the increase in demand.

5. **Existing CBC building.** The CBC building on the north-east portion of the site could impede future expansion of the Halifax Infirmary site. If not demolished the helicopter cone could prevent vertical expansion of this site.

6. **Helipad and flight cone.** The helipad on the north-east portion of the roof of the infirmary building could impact future development. Additionally, the pathway between the helipad and the Charles V. Keating Emergency and Trauma Centre is long and inefficient.

7. **Lack of Street identity.** Many of the buildings on the Halifax Infirmary site are setback from the street wall. There is very little street frontage which contributes to the site lacking a sense of entry and identity.

8. **Shipping and Receiving.** Shipping and Receiving is in a critical location for all phases and will most likely be expanded in current location.

9. **View corridor.** A view corridor exists protecting views of the Citadel.

Fig. 301 HI Constraints

1. **Vertical expansion above the emergency and trauma centre.** An opportunity exists to build above the Charles V. Keating Emergency and Trauma Centre. It is currently only one story and could accommodate an additional 5 floors of vertical expansion, providing direct connection to HI.

2. **Parking lot redevelopment.** The parking structure along Robie Street could need to be relocated. Development of this site would provide street frontage along Robie Street and could be a natural location of new main entrance way.

3. **CBC building development.** The CBC site on the north-east corner of the site could serve as place for redevelopment. The site is adjacent to both the Emergency and Trauma centre as well as the Halifax Infirmary.

4. **Open space development.** The open space on the north-west corner of the site could accommodate infill development, however, the urban farm may need to be relocated.

5. **Connection between opportunity 2 and 4.** Further infill development could occur between the parking structure and the open space.

6. **2030 demolition and redevelopment.** Based on the facility condition assessment the Abbie J. Lane building will need to be replaced.

7. **Relocation of helipad.** The Helipad on top of the Halifax Infirmary could be relocated to the intensified Emergency and Trauma Centre. This would result in the helipad being closer to the services it functions resulting in quicker response times. The flight cone would need to be considered for this intervention.

8. **Multiple entrance points.** The Halifax Infirmary site has the advantage of multiple entry opportunities.

9. **Potential development site.** The shipping and receiving could potentially be expanded or reconstructed to accommodate increased program requirements.

10. **Development of eastern site.** The triangular site to the east of the Halifax Infirmary site could be used for potential expansion.

11. **Topography of site.** The sloping nature of the CBC site could be beneficial when constructing new buildings and linking them to the existing site.

Fig. 302 HI Opportunities

3.1 Halifax Infirmary (HI) Site

3.1.3. Halifax Infirmary Available Land Study

The north-west corner of the Halifax Infirmary site is vacant and has an approximate area of 12,150 m^2. It is the largest piece of available land between the two sites. The space is within the Peninsula Centre Area zoning area. There are smaller pieces of available land throughout the site, however, these were deemed too small to include, given their proximity to existing buildings or adjacencies to parking lots/structures.

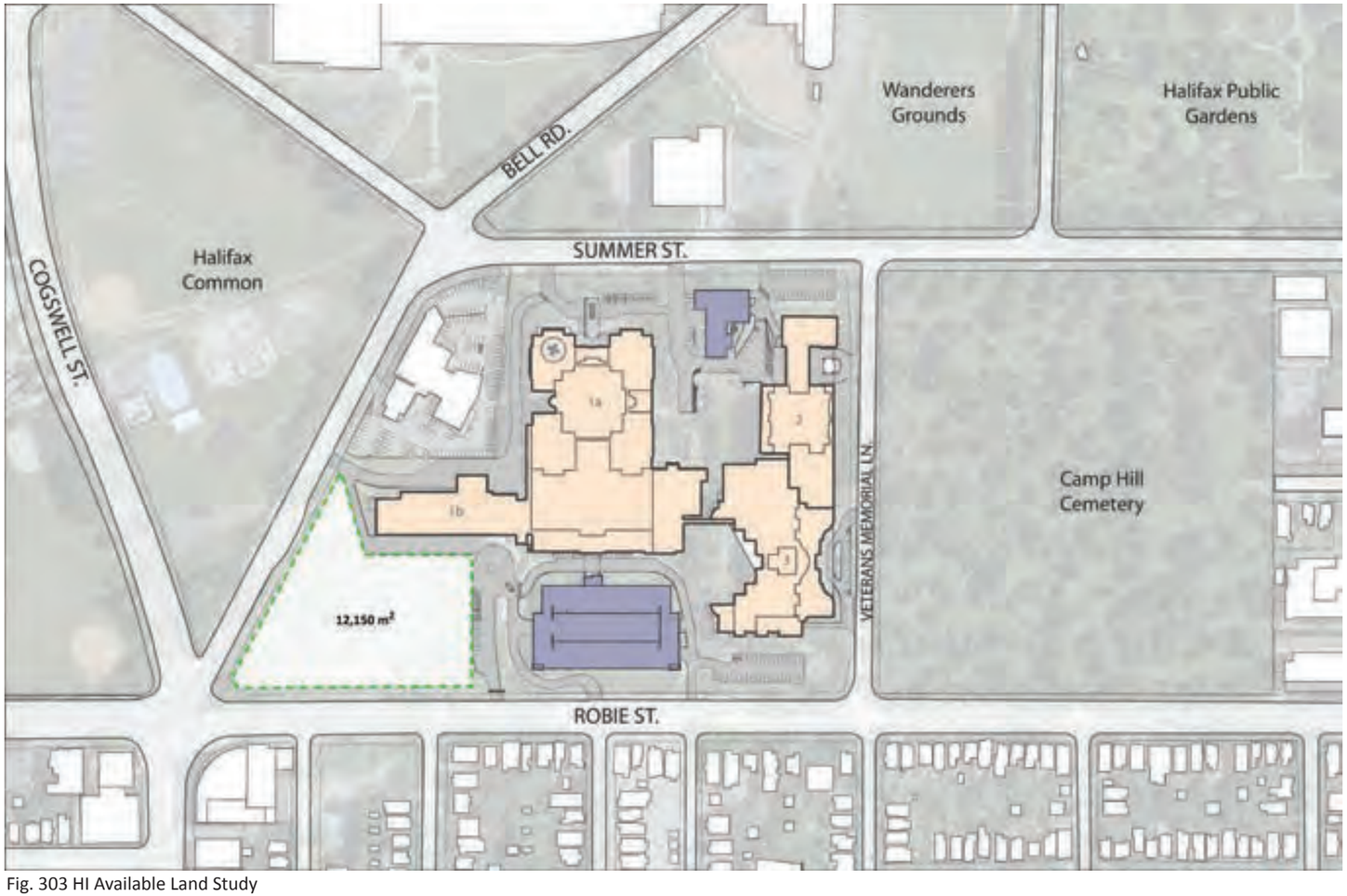


Fig. 303 HI Available Land Study

3.2 Victoria General (VG) Site

3.2.1. Victoria General Site Constraints

1. **Lack of open space.** The site contains very little green space and open space. The pedestrian realm is not pleasant with longer walks required from parking lots to building entrances.

2. **Confusing/inefficient drop-off/parking system.** In order for patients to be dropped off by car a long confusing path must be taken. Furthermore, once patients are dropped off, their drivers must then find a parking space, and then walk back to the entrance.

3. **Large building footprints.** Much of the site is occupied by either hospital buildings or surface parking lots creating few locations where new structures could be constructed to accommodate relocation of services as buildings are decommissioned and redeveloped.

4. **Disconnected site.** The Nova Scotia Rehabilitation Centre and its surface parking lots are separated from the main site via University Ave.

5. **Existing servicing and loading.** The existence of servicing and loading on the South East of the site could provide a constraint in future improvements.

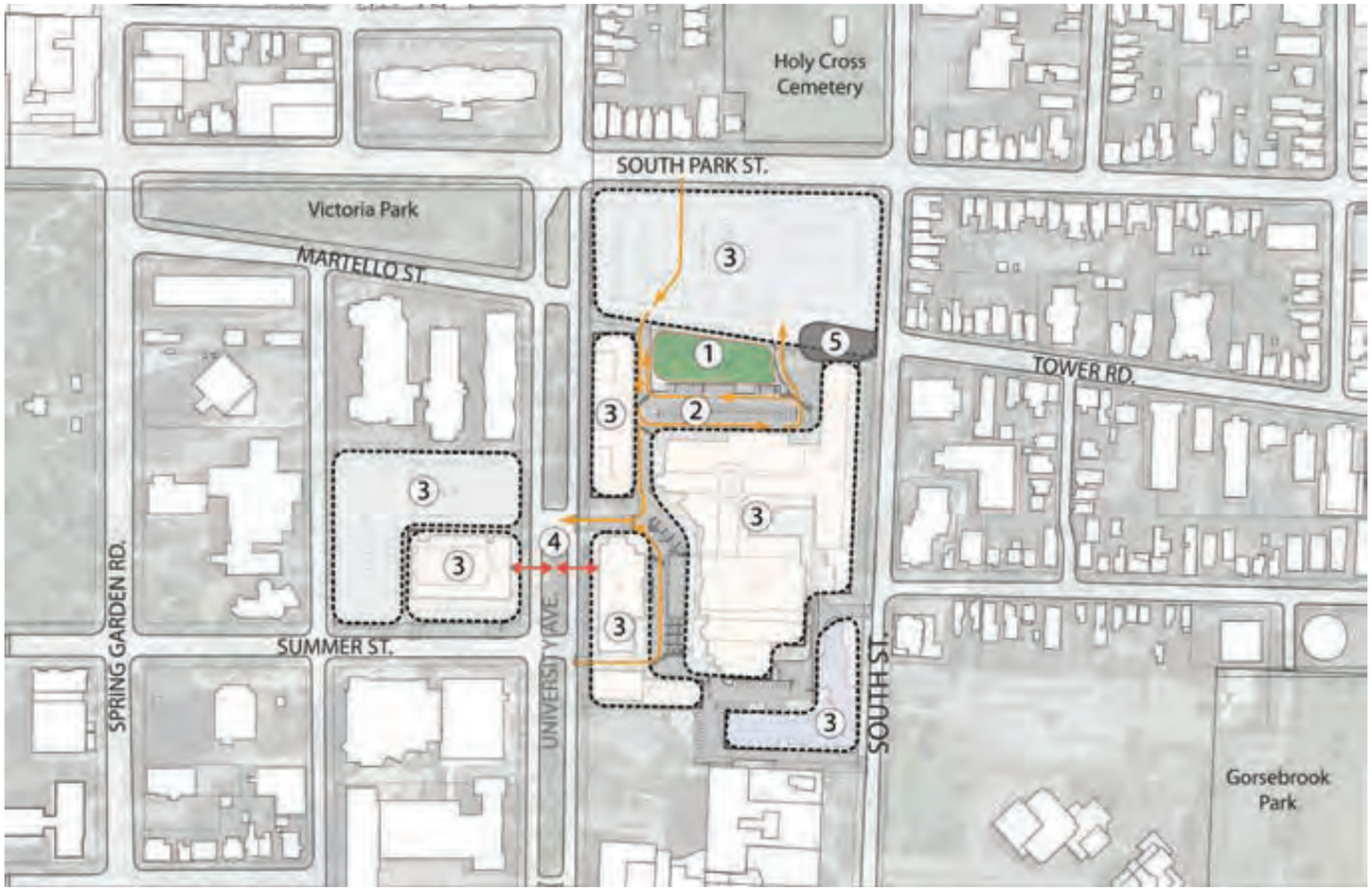


Fig. 304 VG Constraints

3.2 Victoria General (VG) Site

3.2.2. Victoria General Site Opportunities

1. **Surface parking space.** The Victoria General site contains a substantial amount of surface parking lots which could be used in the future for infill development to accommodate the relocation of services or as a potential new site for an urban garden.

2. **Continuation of green space.** An opportunity exists to extend the green space along Martello Street.

3. **Reintroduce Martello Street.** Martello Street is currently severed by the Eastern most surface parking lot. Martello Street could be reconnected creating a continuous thoroughfare as well as more street frontage.

4. **Intensify Cancer Clinic.** Both the Centennial and Victoria buildings along with the space adjacent to them could be intensified to make way for the necessary relocation of services.

5. **New connections/linkages**, new entryway opportunity. Vehicular and pedestrian connections between both the Rehabilitation Centre and the Halifax Infirmary Site to the Victoria General Site could be improved. The terminus of these new linkages would be logical locations for entrances.

6. **2030 demolition and development of Bethune building.** Based on the facility condition assessment Bethune could be the site of future redevelopment.

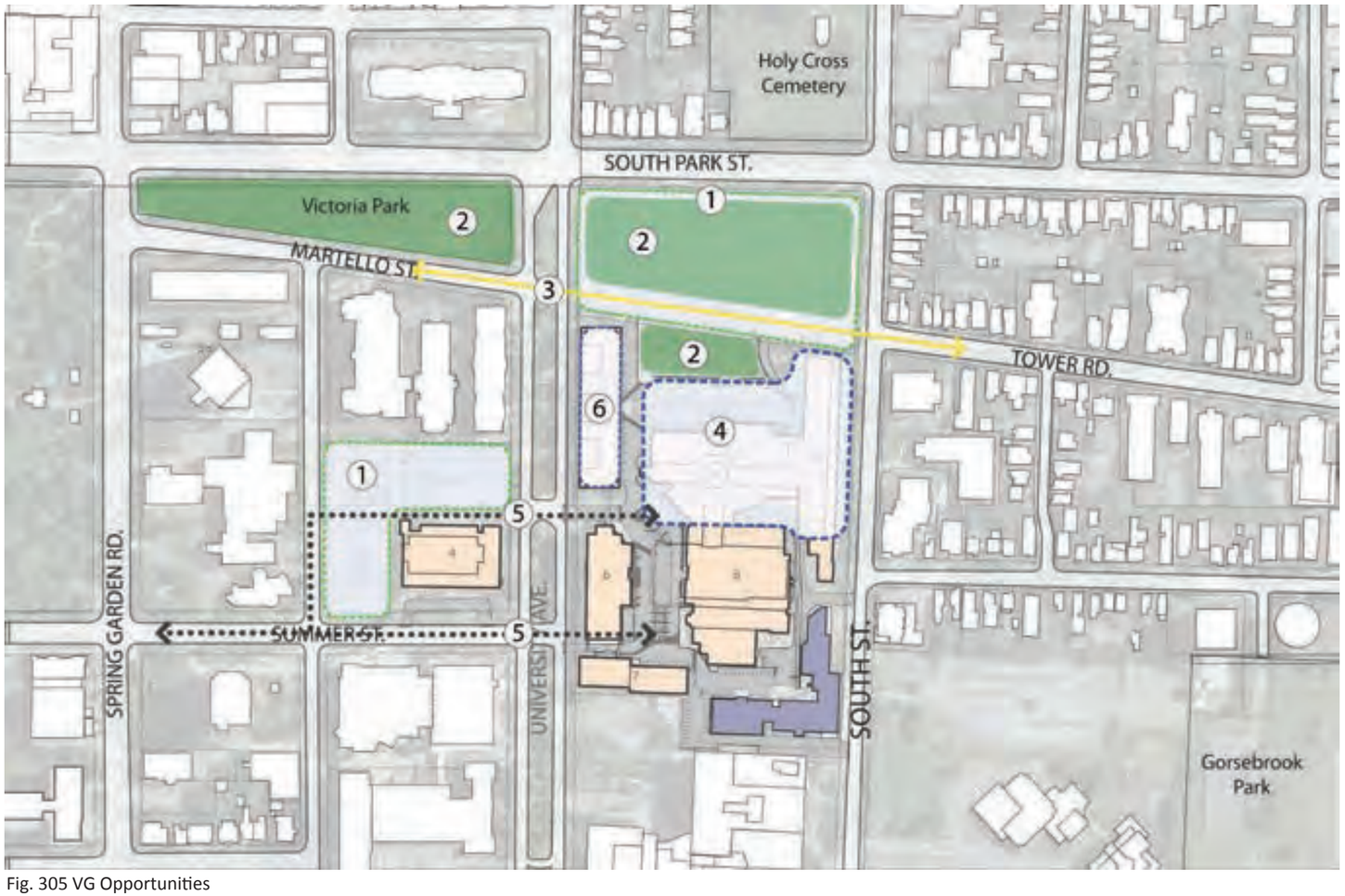


Fig. 305 VG Opportunities

N

3.2 Victoria General (VG) Site

3.2.3. Victoria General Available Land Study

The eastern portion of the Victoria General site contains a smaller piece of available land which is situated between two parking lots. It is approximately 2,200 m^2. The space is within the South End Area (district 2) zone.

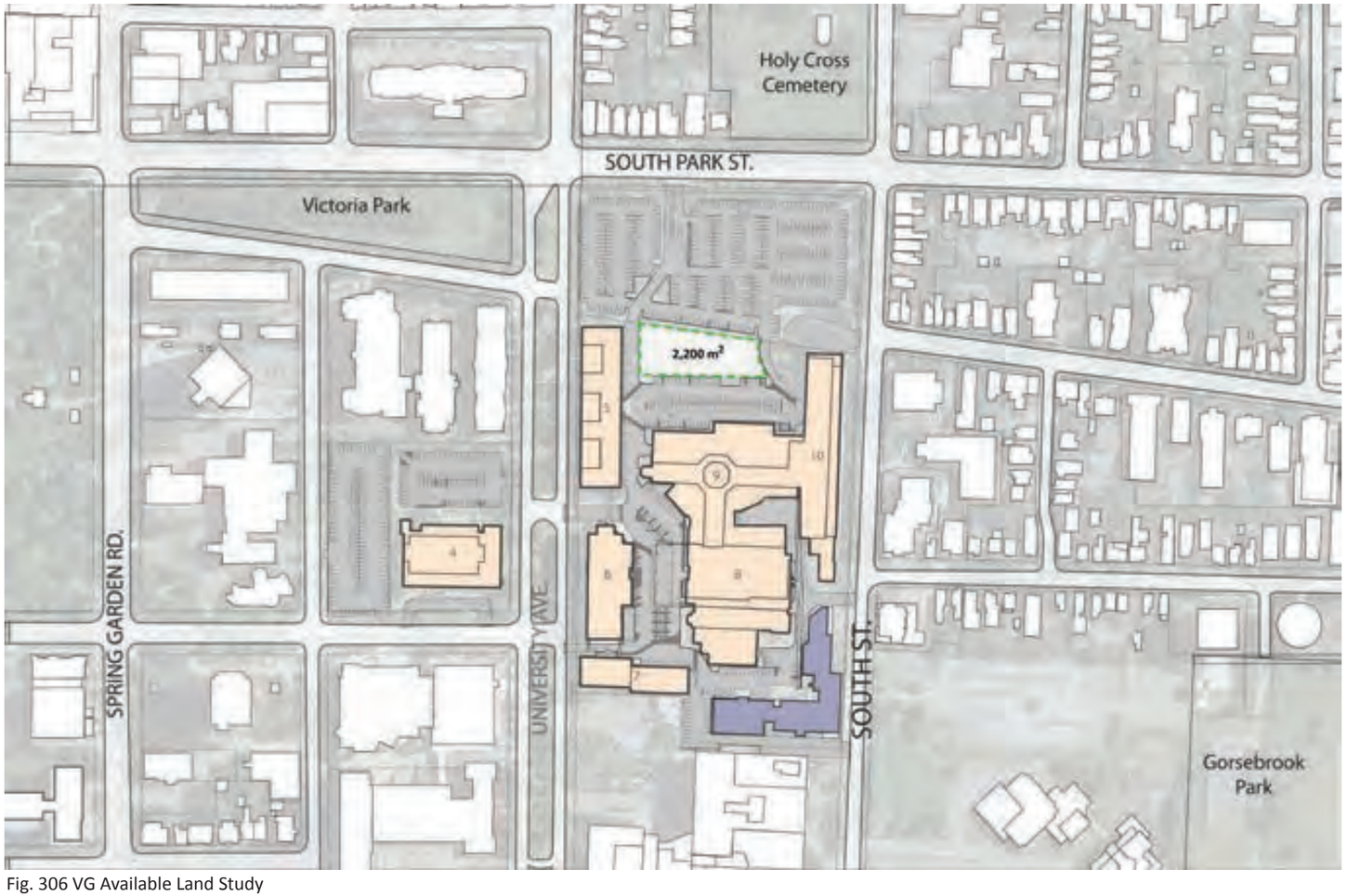


Fig. 306 VG Available Land Study

3.3 Precedents

3.3.1. People Places

Healing Environments

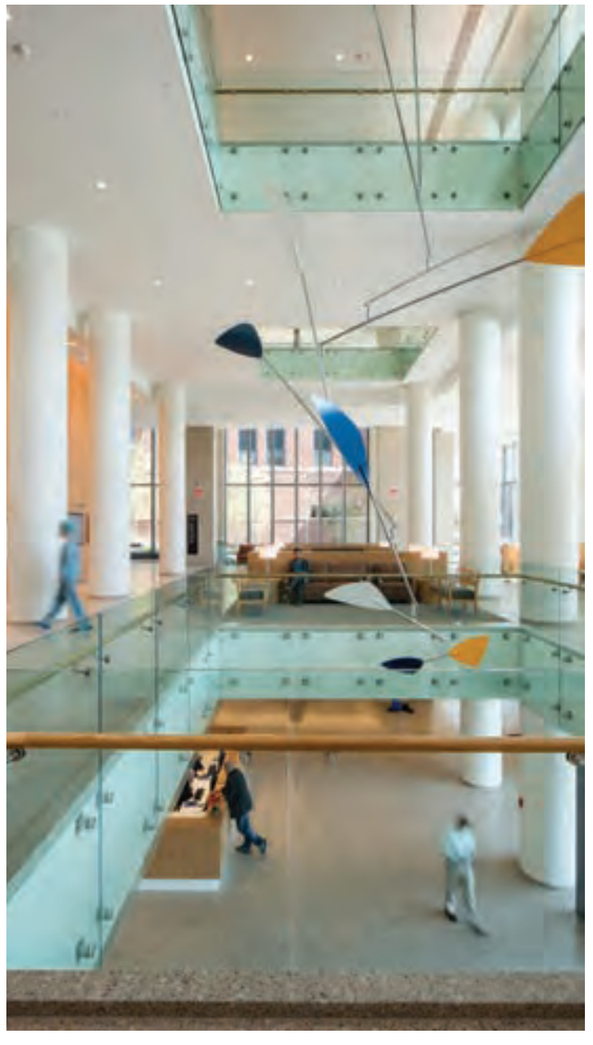
Indoor/Outdoor

3.3 Precedents

3.3.1. People Places

Wayfinding

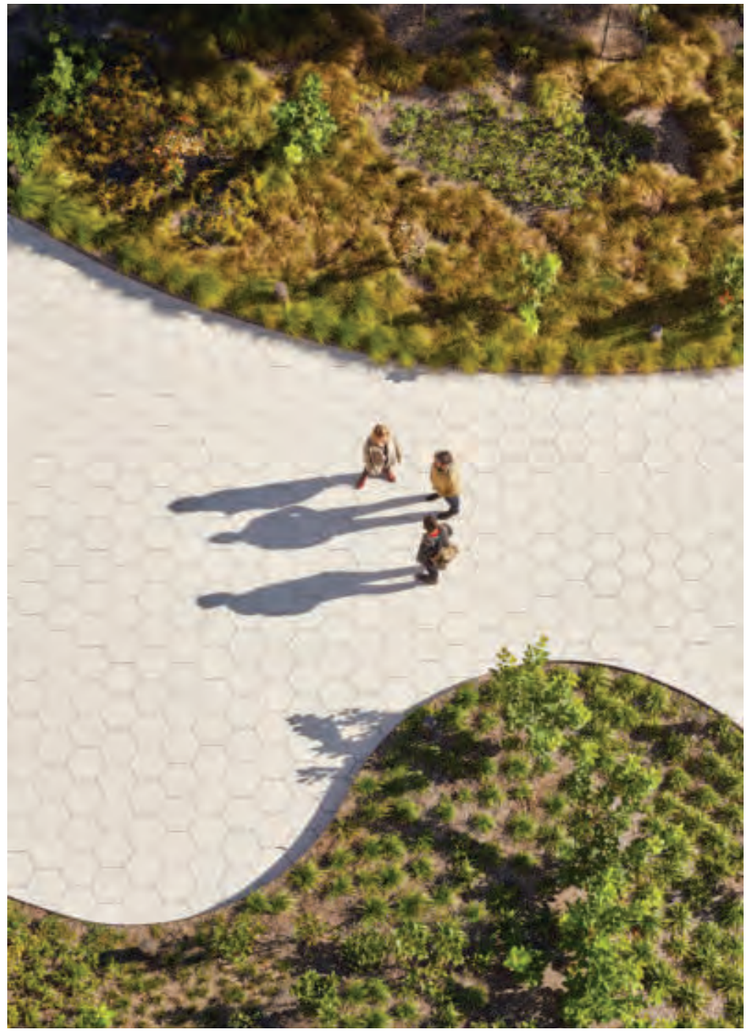
Natural Light



3.3 Precedents

3.3.1. People Places

Green Spaces

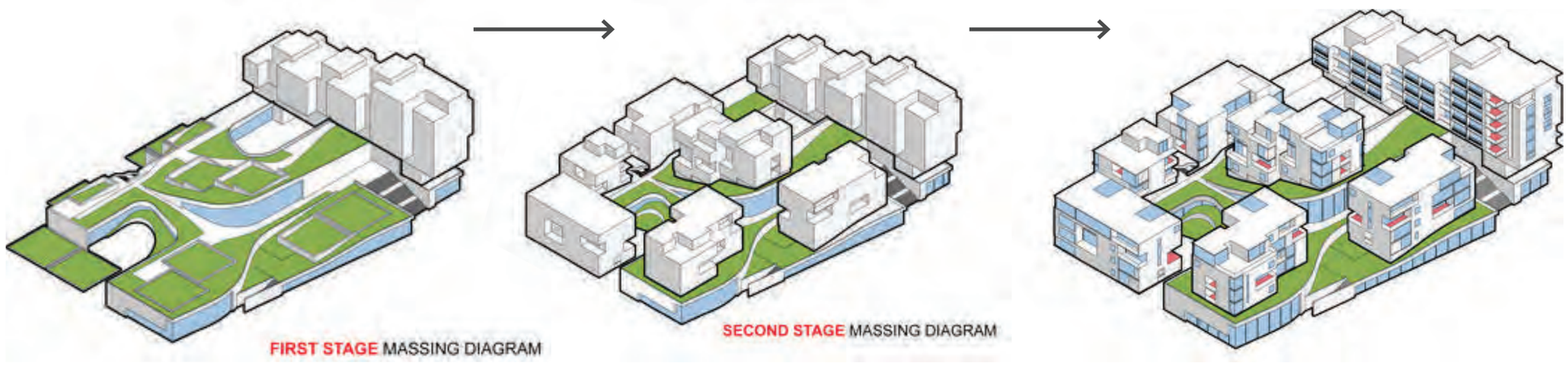


Massing/Blocking

3.3 Precedents

3.3.2. Master Plan

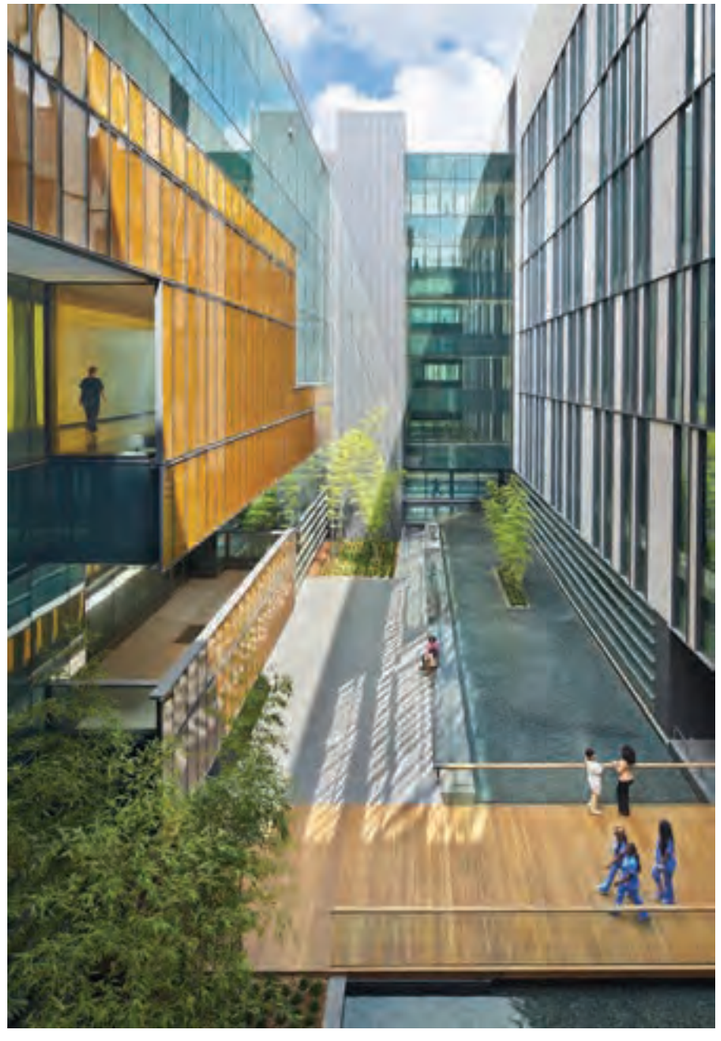
Phased Development



Site Context

kasian

Green Terraces



BA Group

QEII – Halifax Infirmary

Preliminary Parking Review

July 18, 2017

[7832-01]

Factors affecting parking supply needs

- Existing Demand
- Changes in Hospital Program (Staff, Floor Area, etc.)
- Location and Revenue Control
- Off-site Parking Opportunities
- Physical Ability to Build New Parking
- Transportation Demand Management
- Availability of Public Transit
- Traffic Impacts / Congestion
- Level of Service / Customer Expectation

MOVEMENT IN URBAN ENVIRONMENTS 2

Transportation Study – Status Update

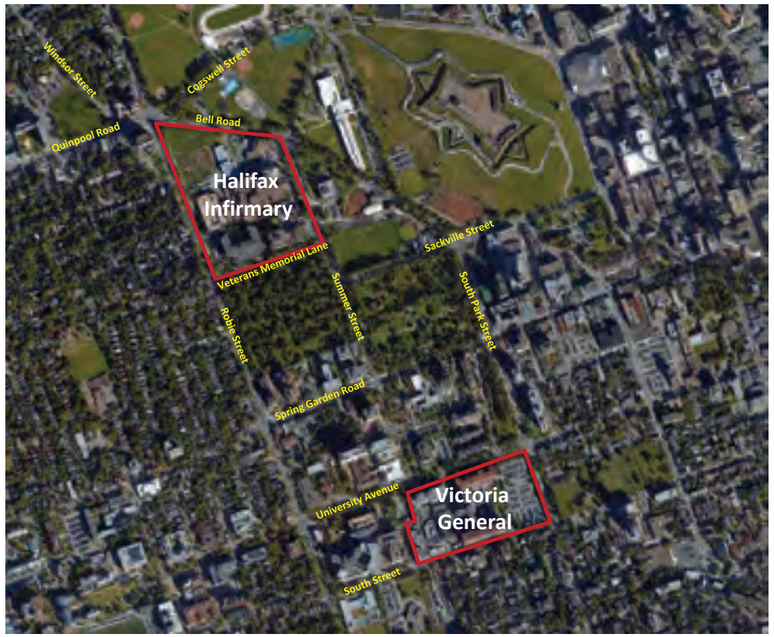
Work completed to date:

- Data collection programme:
  - Parking and traffic surveys
  - Confirmation of existing parking supply
  - Review of parking data from parking operator
- Meetings with key stakeholders
  - City of Halifax and QEII staff
  - Indigo Parking (QEII parking operator)
- Develop high level parking estimates
- Identify preliminary parking supply options

Site Context – QEII Health Sciences Centre

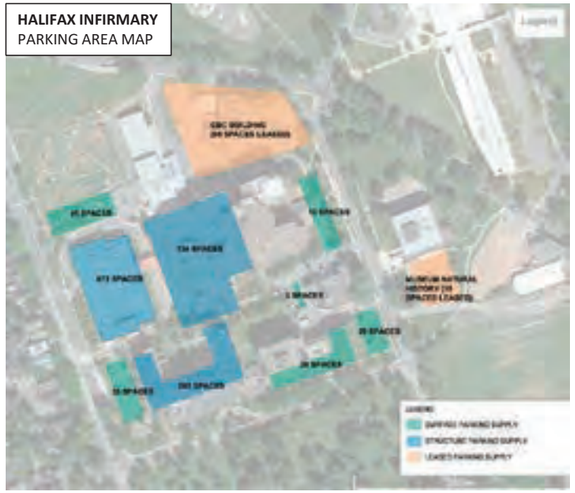
*Note: Preliminary Parking numbers subject to further review and study.

Site Context – QEII Health Sciences Centre



QEII: Existing Parking Supply

HALIFAX INFIRMARY
PARKING AREA MAP

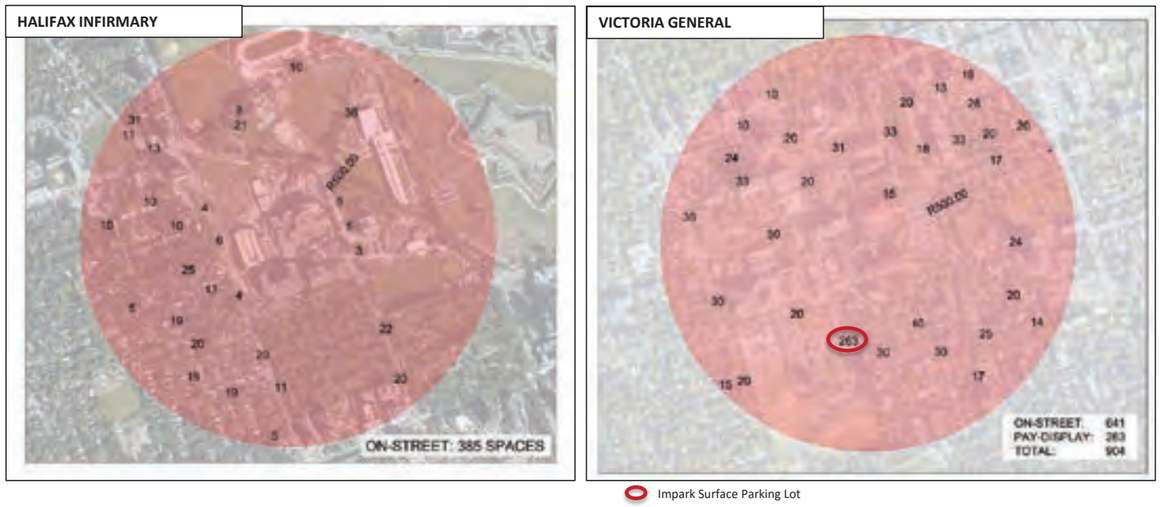


HI Parking Supply	**1, 302 spaces**
On-Site Parking Supply	1,193 spaces
Leased Supply	109 spaces

VICTORIA GENERAL
PARKING AREA MAP

VG Parking Supply	**919 spaces**
On-Site Parking Supply	749 spaces
Off-Site Supply	170 spaces

QEII: Estimated Area Public Parking



QEII: Parking Supply Ratios

Hospital		Number of Spaces	Parking Ratio (DGSF)[12]
Halifax Infirmary	Existing HI Parking Supply (including off-site leased parking)	1,302 spaces	1.4 spaces per 100 sm
	Estimated On-Street HI Parking Supply (within 500 metres)[3]	300 spaces	0.3 spaces per 100 sm
	Total Parking Supply (on and off-site)	**1,602 spaces**	**1.8 spaces per 100 sm**
Victoria General	Existing VG Parking Supply	919 spaces	0.9 spaces per 100 sm
	Estimated On-Street VG Parking Supply (within 500 metres)[3]	500 spaces	0.5 spaces per 100 sm
	Total Parking Supply (on and off-site)	**1,419 spaces**	**1.4 spaces per 100 sm**
QEII Total	Existing Parking Supply	**2,221 spaces**	1.16 spaces per 100 sm
	Estimated On-Street Parking Supply (within 500 metres)	**800 spaces**	0.42 spaces per 100 sm
	Total Parking Supply (on and off-site)	**3,021 spaces**	**1.6 spaces per 100 sm**

1. The existing Halifax Infirmary DGSF (90,090 m²) was provided by Kasian Architecture on July 13, 2017.
2. The existing Victoria General DGSF (100,934 m²) excludes the NS Rehab building and was provided by Kasian Architecture on July 13, 2017.
3. On-street parking related to the hospital was estimated based on the available supply within a 500 m radius

Typical Hospital Characteristics

Typical Parking Supply

- 2.0 – 3.5 spaces / 100 m² DGSF

Staff vs. Visitor Parking

- Staff typically represent 60% to 75% of hospital parking demand
- Visitors typically represent 25% to 40% of hospital parking demand

QEII on-site parking supply (0.9 – 1.4 spaces/ 100 sm DGSF) is lower at typical hospitals.

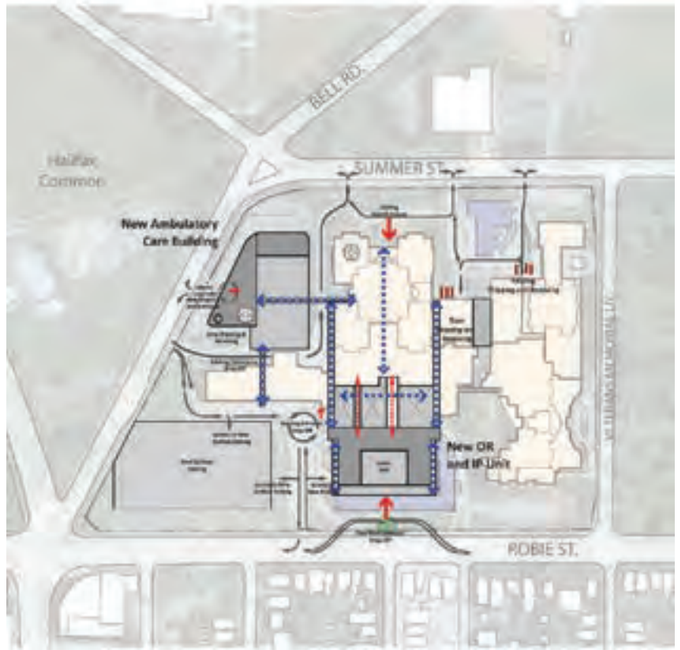
QEII on- and off- site parking supply (1.4 – 1.8 spaces/ 100 sm DGSF) is also lower than typical hospitals.

Building Concept Assumed – HI Site (Willow Tree- Test Fit D)

Key Changes:

+ More future ambulatory program than typical (ambulatory uses generate higher parking demands)
+ HI almost doubling in size
+ General Growth in Hospital visits and staff

- Floor area for new in patient is typically greater than the current floor area for the same activity level
- Existing Veteran's Memorial building may not generate parking demands at the same rate as the hospital
- Off-site (free) parking reduces the on-site demand



Building Concept Proposed – VG Site

Key Changes:

- Significant amount of floor area being decanted from VG (to HI and potentially other facilities)
- No new QEII Hospital uses being constructed
- Victoria and Centennial buildings being demolished
- Bethune building may be demolished

Floor Area Summary – Preliminary DGSF

Location	Existing	Ambulatory	In-patient/Other	Net New	Total
Halifax Infirmary Site Area 961,000 sq.ft (22 Acres)	969,727 sq.ft (90,091 sm)	416,116 sq.ft (38,658 sm)	337,635 sq.ft (31,367 sm)	753,751 sq.ft (70,025 sm)	1,723,478 sq.ft (160,116 sm)
Less HI Relocated	-	-65,889 sq.ft -(6,121 sm)	-	687,862 sq.ft (63,904 sm)	1,657,589 sq.ft (153,995 sm)
Victoria General Site Area 647,600 sq.ft (14.9 Acres)	1,086,444 sq.ft (100,934 sm)	-107,640 sq.ft -(10,000 sm)	-114,498 sq.ft -(10,637 sm)	-222,138 sq.ft -(20,637 sm)	864,306 sq.ft (80,297 sm)
Total	2,056,171 sq.ft (191,025 sm)	242,577 sq.ft (22,536 sm)	223,142 sq.ft (20,731 sm)	**465,719 sq.ft (43,267 sm)**	2,521,890 sq.ft (234,291 sm)

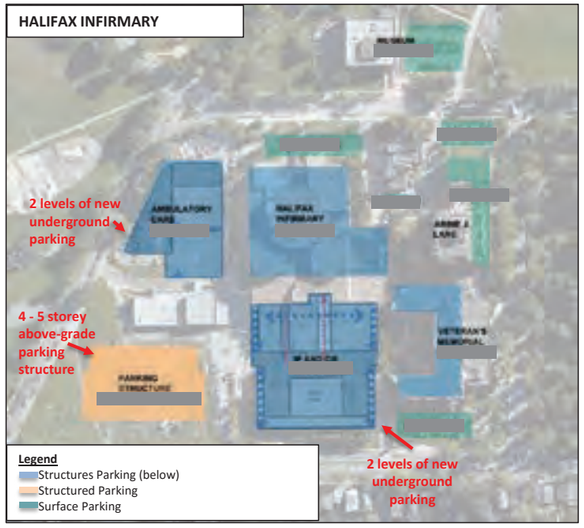
N

Parking Projections: Initial Approach

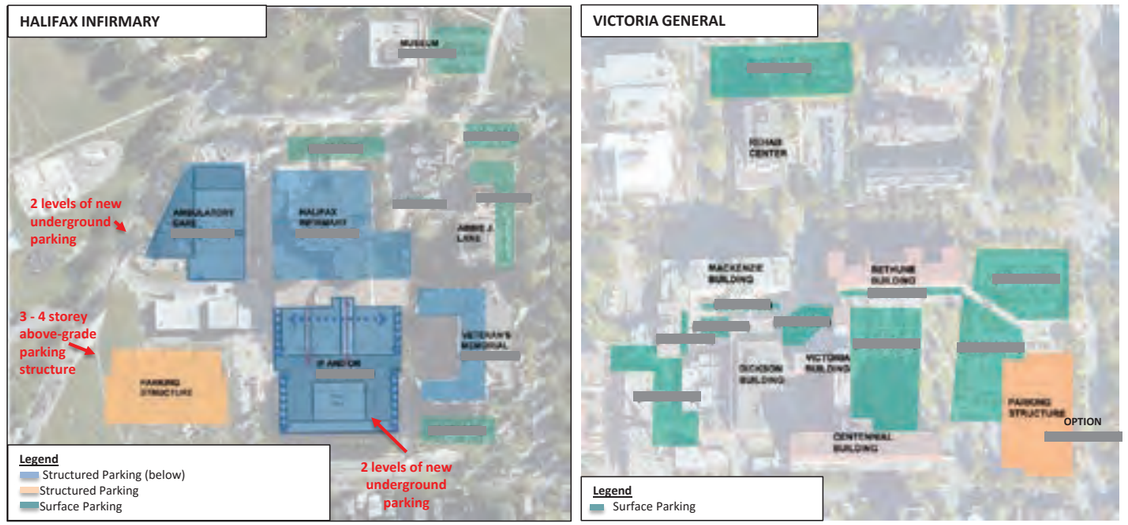
Key Assumptions

- The **minimum** parking requirement for the Hospital is the addition of the current on-site and estimated off-site parking supply
- Ambulatory and In-patient facilities at VG moving to HI. No new hospital functions at VG; only replacement buildings.
- The two hospital sites (HI and VG) may operate together from a parking supply perspective in the future
- Net new departmental floor area has been used to determine additional parking requirements

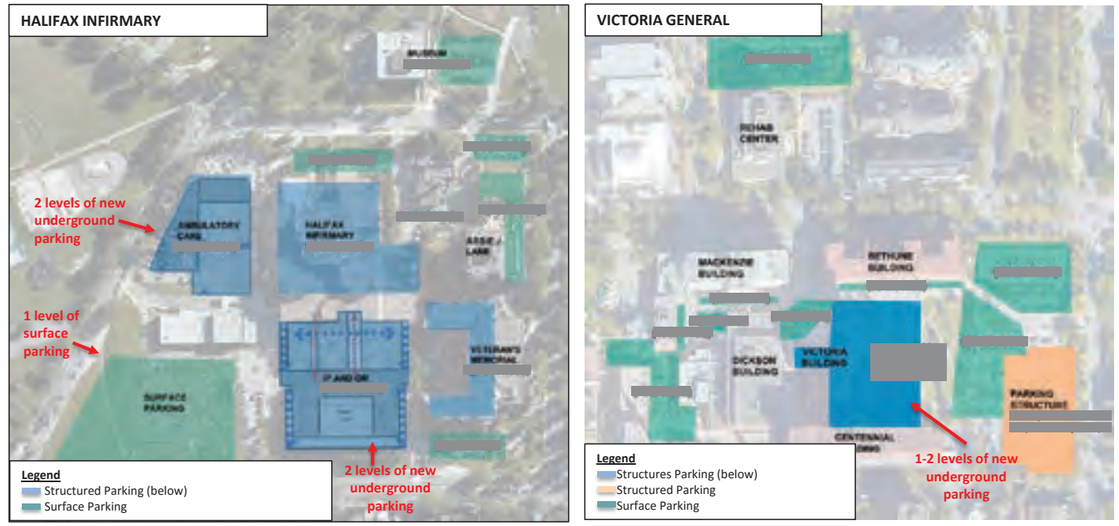
Scenario 1:
Meet all new and existing parking supply on HI site



Scenario 2:
Supply new and existing HI parking on-site and former VG parking remains on VG



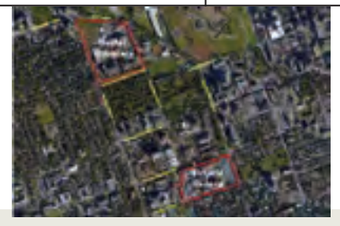
Scenario 3:
Meet new and existing parking supply on both HI and VG combined



N

Phasing Considerations - Parking

Phase	Changes	Replacement Options	Parking Space Deficit
A: 2018 Preliminary HI Site Work	• Demolish or relocate existing parking structure (672 spaces) • Remove Emergency Parking Lot (25 spaces) • Eliminate CBC leased parking (90 spaces) **Total Lost: -787 spaces**	1) Build new or move existing parking structure/ surface parking on the HI urban garden site (790 spaces) 2) Build surface parking on urban garden site (350+ spaces) 3) Accommodate parking off-site/TDM	0 spaces 440 spaces up to 440 spaces
B: 2019-2020 Head-start Projects	No change	No change	0-440 spaces
C: 2021-2027 Construct new on HI, Demolish old on VG	• New below-grade parking supply on HI complete (1,220 total on-site HI parking)	• Minimize surface parking disruption during demolition on the VG site	0-440 spaces
D: Post 2028	All new parking is complete	See options for new parking supply	-



Ways to mitigate parking demand and/or improve parking level of service

- Promote Public Transit Use
- Dedicated shuttle bus (e.g. to/from Dartmouth)
- Carpooling
- Regulate Parking Fees
- Bicycle Parking and Shower / Change-Room Facilities
- Emergency Ride Home Program
- Market / Educate / Inform
- Future Changes in Travel Characteristics (e.g. autonomous vehicles)

Next Steps

- Refine concept plans and related parking supply estimates
- Examine phasing options in more detail
- Preliminary review of transportation elements for the concept plans
- Conduct transportation interview surveys of Hospital staff and patients
- Refine the Hospital's Transportation Demand Management Plan
- Review traffic operations in site environs

4

Existing Building Analysis

4.1 Facility Condition Assessment Summary

In reviewing the Facility Condition Assessment for the VG and HI sites across all disciplines it is apparent that most of the facilities have reached or are reaching the end of their useful life. While some aspects of the services and elements in the various buildings could have their life cycles extended by significant capital reinvestment, these expenditures will only extend the inevitable required replacement of the services and facilities.

It is critically important that the Master Plan Development recognizes the age and condition of the facilities, and methodically replace and redevelop the two sites with buildings and services based on the programmatic requirements.

*Note: QE II is in the process of updating the facilities assessment report. This information will be included in the next submission.

The following chart summarizes the assessment findings:

FACILITY CONDITION ASSESSMENT	Site & Grounds			Structural				Envelope			Interiors			Fire & Life Safety	Occupational Health & Safety	Barrier-free Compliance
	Circulation	Grading	Landscaping	Foundations	Frame	Cladding	Roofs	Roofing	Cladding	Openings	Partitions / Doors	Finishes	Millwork			
VG Site																
Bethune	◐	●	●	●	●	◐	●	◐	○	○	○	○	◐	●	●	○
Centennial	○	◐	●	●	●	◐	●	●	●	◐	◐	○	◐	○	●	○
Centre for Clinical Research	○	◐	◐	●	●	○	○	○	●	◐	○	○	◐	○	○	◐
Dickson	○	◐	◐	●	●	●	●	●	●	◐	○	◐	○	●	●	◐
Mackenzie	○	◐	◐	○	○	○	○	◐	○	○	○	◐	○	○	○	○
Rehab Centre	○	●	●	●	○	◐	●	●	○	○	○	○	◐	○	●	○
Victoria	◐	○	●	○	●	○	●	○	●	○	◐	◐	◐	●	●	◐
HI Site																
Abbie J. Lane	○	●	●	○	○	○	●	○	◐	○	◐	◐	○	◐	○	○
Dartmouth General Hospital	○	○	○	●	●	○	●	◐	○	○	○	○	◐	○	○	○
VMB	○	○	●	●	●	○	●	○	◐	○	○	◐	●	●	●	○

● good ○ fair ◐ poor ○ very poor ● obsolete

FACILITY CONDITION ASSESSMENT	Mechanical								Electrical												
	Heating	Ventilation	Cooling	Domestic Water	Storm/Sanitary Drainage	Sprinklers	Medical Gases	Controls	Service	Distribution	Power	Lighting	Emergency Lighting	Fire Detection/Alarm	P.A.	Telephone / Data	TV /	Nurse Call	Security / CCTV	Equipment Rooms	Functionality
VG Site																					
Bethune	○	●	●	○	○	○	-	◐	○	○	○	○	◐	●	-	○	-	-	○	●	
Centennial	●	●	○	○	○	●	●	●	◐	○	○	○	●	●	●	●	●	●	◐	◐	
Centre for Clinical Research	○	○	◐	○	○	◐	-	◐	●	○	○	○	◐	●	-	○	-	-	●	○	
Dickson	◐	○	◐	○	●	◐	○	◐	○	●	●	○	●	●	●	●	●	○	◐	○	
Mackenzie	●	●	●	◐	●	○	●	○	●	◐	○	◐	●	●	-	○	●	-	◐	○	
Rehab Centre	●	○	○	○	●	●	●	○	○	●	◐	◐	◐	○	-	○	●	○	◐	◐	
Victoria	●	●	●	○	●	●	○	○	●	○	○	◐	●	●	●	○	●	○	◐	◐	
HI Site																					
Abbie J. Lane	◐	◐	◐	◐	◐	○	○	◐	●	○	○	○	●	●		○	●	●	○	●	
Dartmouth General Hospital	◐	○	◐	○	●	○	◐	○	●	○	◐	◐	◐	●	●	○	-	○	-	-	
VMB	○	◐	○	○	●	●	○	●	●	●	○	○	○	●	-	○	◐	○	◐	●	

● good ○ fair ◐ poor ○ very poor ● obsolete

Fig. 401 Facility Condition Assessment

QEII REDEVELOPMENT PROJECT
HALIFAX, NS

STRUCTURAL ENGINEERING IMPLICATIONS

Prepared for:

Kasian Architecture Ontario Incorporated

85 Hanna Avenue, Suite 300
Toronto, Ontario
M6K 3S3

Prepared by:

BMR STRUCTURAL ENGINEERING

5413 Doyle Street,
Halifax, NS
B3J 1H9

April 17, 2017

INTRODUCTION

BMR Structural Engineering Limited has been engaged by Kasian Architecture to review structural implications of various options for the Redevelopment of the QEII Hospital sites. This review covers both the Halifax Infirmary (HI) Site and the Victoria General (VG) Site.

HALIFAX INFIRMARY SITE

HI 1.0 Vertical Expansion Above Existing Emergency Department

Although the columns and foundations supporting the New Emergency Department were designed and constructed to support five additional floors, there are some serious issues which should be considered before moving too quickly on this front.

Currently, the main floor of the Emergency Department (ED) is a slab on grade at level 300. There is a small section of basement at the very north end. The mechanical penthouse floor is at Level 400 which is also the current main roof of emergency. The Roof over the mechanical penthouse is currently at or near Level 500.

The south end of the ED (nearest the original hospital) was only designed for two additional floors to match the existing adjacent hospital at this location.

In addition to this absolutely no allowance was designed into the existing ED structure to resist lateral loads from future vertical additions. There is no core or stairs or elevators and therefore nothing to resist lateral loads for any addition. The intent was that any future addition would include a lateral load resisting system. This means that new stair and elevator cores will have to be constructed somewhere outside of the footprint of the existing building unless significant renovations are done within the existing ED.

It will be a very complex and difficult endeavor to construct a five storey addition directly above a working hospital. There will no doubt be significant noise, vibration and many other inconveniences.

HI 2.0 Demolition and Relocation of Existing Robie Street Parking Structure

BMR has reviewed the condition of the existing precast concrete structure and are of the opinion that the parking structure is in good condition and that the structural components could be disassembled, transported to another site and reconstructed at some savings versus building a new parking structure from scratch.

Based on boreholes from a year 2000 geotechnical report, the bed-rock surface under the parkade is in the range of Elevation 150-155 feet which is significantly lower than the elevation of the lowest existing parking level which is at Elevation 174 feet, therefore there is potential to construct one or two additional levels below grade without encountering much bed-rock. Unfortunately based on this same year 2000 geotechnical report there is a layer of “construction waste material” and slate rock fill beneath at least a portion of the parking structure. This material would need to be removed from the site in order to claim the volume beneath the current parkade as occupiable space. There could be some significant costs in disposing of the construction waste material and slate rock fill?

4.2 Structural Report

HI 3.0 CBC Site

BMR had access to a geotechnical investigation report carried out on the CBC site in 1989. This report indicates that the bed-rock surface elevation ranges from approximately 139 feet to 144 feet. This indicates there may be some potential to get one underground storey without having to remove too much bed-rock?

HI 4.0 Urban Garden Site

BMR put together information from five Geotechnical Investigations carried out over the years and illustrated on one complete HI site drawing the elevation of the bed-rock surface as could be determined from these reports. We have no information on the Urban Garden corner of the site (the former QE2 High School site). We recommend getting five or six boreholes drilled down to bed-rock on this portion of the site so we can fully understand the elevation of the bed-rock surface and the opportunities and/or challenges this may pose to future development.

HI 5.0 Existing Buildings

BMR has first-hand knowledge of the structure of several of the buildings on the site having been the structural consultants of record when the buildings were designed and constructed. This includes the Halifax Infirmary, the addition on the west side of the infirmary including the Brain Repair Centre, the Parking Structure and the Emergency Department expansion. These buildings were designed and constructed to meet the Building Codes in effect at the time of construction. Since the construction of these buildings there have been some significant revisions to the building codes resulting in higher snow loads, wind loads and seismic loads particularly for “Post-Disaster” Buildings such as hospitals. The older buildings on site including the VMB, Abbie Lane and Power Plant would have been constructed to even earlier building codes and are probably less compliant with the current codes.

It would be a very expensive proposition to bring the buildings on site up to current standards and it is the opinion of the undersigned that it is not necessary to do so. It does not state in the current building code that buildings constructed to previous codes must be up-graded. The largest short-comings would be in the area of resistance to seismic loads and Halifax is not a high risk area for significant seismic events. Having said this however if significant structural revisions or additions are proposed for existing buildings, these buildings should be upgraded to meet current standards at least in the areas of significant revisions or additions.

To the best of our knowledge other than the Emergency Department there are no buildings or parts of buildings on the HI site which were designed and constructed to accommodate vertical expansion.

VICTORIA GENERAL SITE

VG 1.0 Existing Buildings

BMR has significant knowledge about the structure of most of the buildings on the VG site having been involved on numerous projects within most of these buildings at one time or another although BMR were not the original structural designers of any of the buildings.

All of the buildings on the VG Site were designed and constructed at a time long before the current editions of the National Building Code of Canada (NBCC) came into effect. In fact The Clinical Research Building (1922) was constructed before the very first edition of the NBCC was introduced in 1941. Since the construction of these buildings there have been some significant revisions to the building codes resulting in higher snow loads, wind loads and seismic loads particularly for “Post-Disaster” Buildings such as hospitals.

It is understood that the Victoria Building and the Centennial Building will be demolished as part of the redevelopment plan however this leaves several other aged buildings on the site which no doubt have structural short-comings versus the current NBCC.

It would be a very expensive proposition to bring the remaining buildings on site up to current standards and it is the opinion of the undersigned that it is not necessary to do so. It does not state in the current building code that buildings constructed to previous codes must be up-graded. The largest short-comings would be in the area of resistance to seismic loads and Halifax is not a high risk area for significant seismic events. Having said this however if significant structural revisions or additions are proposed for existing buildings, these buildings should be upgraded to meet current standards at least in the areas of significant revisions or additions.

To the best of our knowledge there are no buildings or parts of buildings on the VG site which were designed and constructed to accommodate vertical expansion.

TO BE UPDATED - MECHANICAL REPORT

4.4 Electrical Report

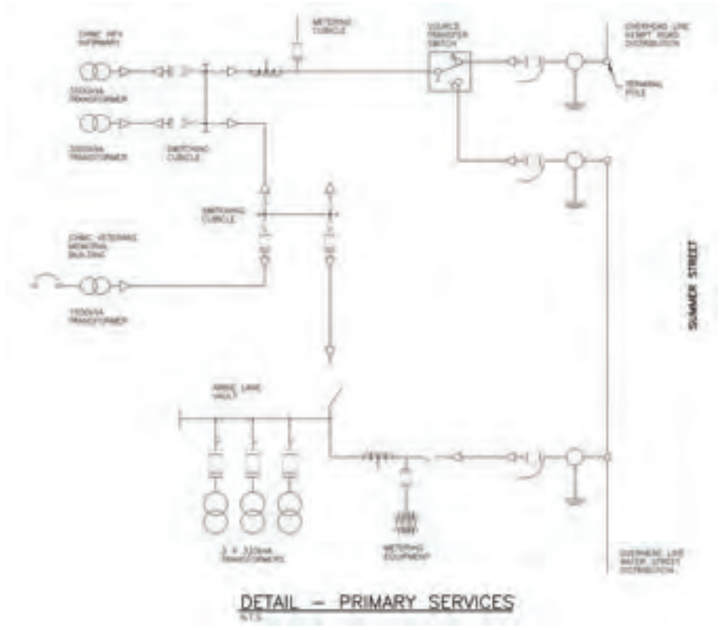
Existing Infrastructure

Medium Voltage Utility Service – Site

The site is serviced with two deferent utility services – one over head utility service from Lower Water Street and a second independent over head utility service from Kempt Road. These utility services are routed under ground from utility terminal poles to a utility owner manual transfer switch located on the property in front of the Halifax Infirmary Site.

These primary metered utility services are responsible for feeding the buildings:

- Halifax infirmary – (2) 3000kVA exterior pad mount transformers.
- Abbie Lane – (3) 333kVA interior “vault configured” transformers.
- Veterans Memorial Building – (1) 1500kVA exterior pad mount transformer.



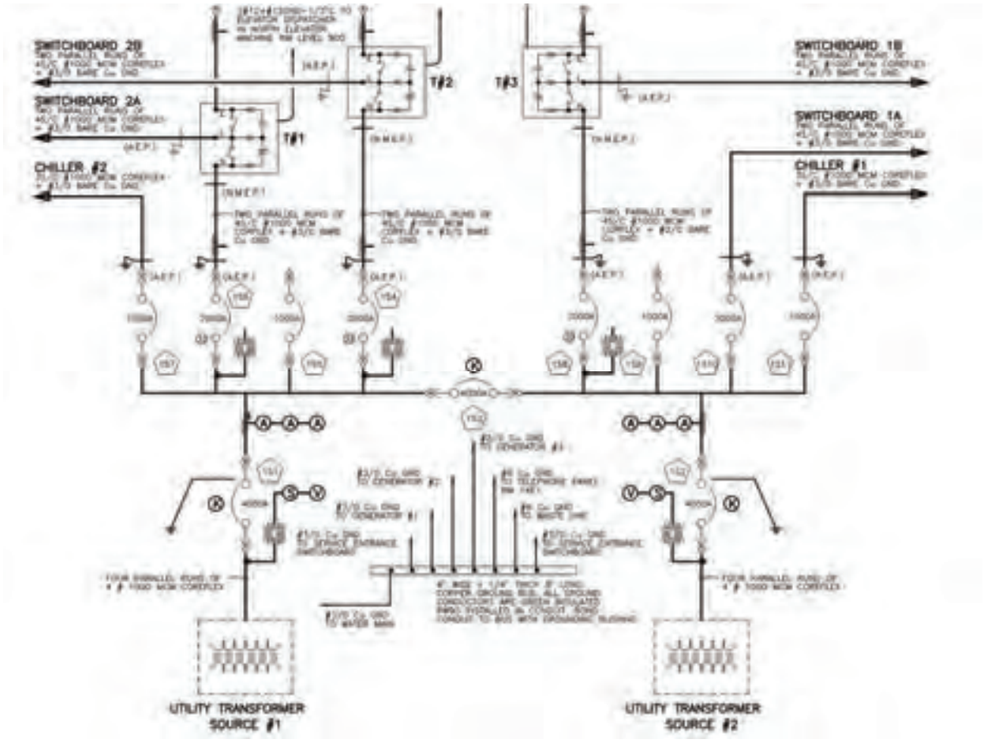
DETAIL – PRIMARY SERVICES

Any changes to the site in terms of building foot print growth along Summer Street will have to be carefully evaluated as it may affect the under-ground utility services and the above ground switching equipment. With careful planning and an in-depth understanding of the site and its interconnected systems alternations can be implemented without major service disruptions to the facilities.

Low voltage – 600V normal and emergency power distribution

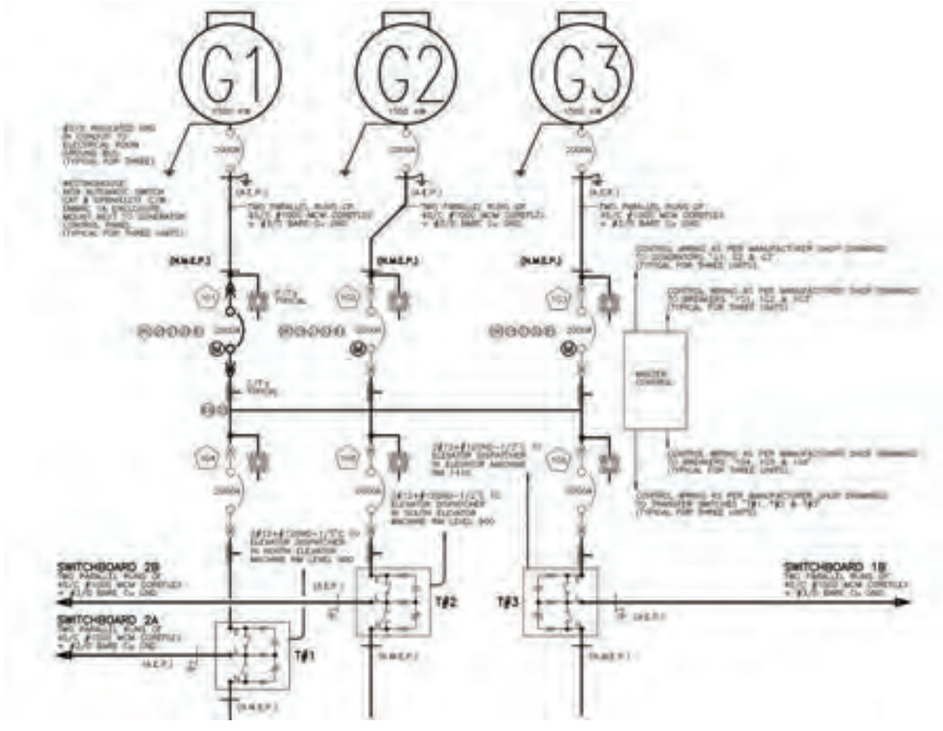
Infirmary:

From a normal power perspective, the infirmary hospital (the acute care center) is serviced with two utility feeders that feed in to a local high voltage switching cubicle that feeds two downstream utility owned 3000kVA transformers. These utility owned transformers are set up two feed two independent 4000A, 600V, 3phase 4wire distribution centers with kirk key interlocks that will enable total switching of the low voltage downstream feeders from either utility transformer should this be necessary – for planned maintenance or transformer/high voltage feeder failure. This arrangement follows the Z32 standard for design of normal power distribution systems.



4.4 Electrical Report

From an emergency power perspective, the infirmary hospital (the acute care center) is serviced with three 1500kW generators that form a total emergency power plant load of 4500kW at 600V 3phase, 4wire. However, based on the Z32 standard we have to ensure that 2/3 of the emergency power capacity can address the emergency power requirements of the heath care facility. That being said we can safely account for 3000kW of “vital” building load to be serviced from this emergency power system. This arrangement follows the Z32 standard for design of normal power distribution systems.



The current building demand on this electrical distribution system has recorded peak values of 2500kVA during the months of July through to October – the months requiring a high cooling load. Based on these recorded values the electrical service has “technically” no spare capacity to support any major expansion to the core Halifax Infirmary. Why are we stating this… if we every have to go to operating the health care facility on one utility transformer for extended period of time over the months June – through to – October we will most likely be at the full capacity of one utility transformer.

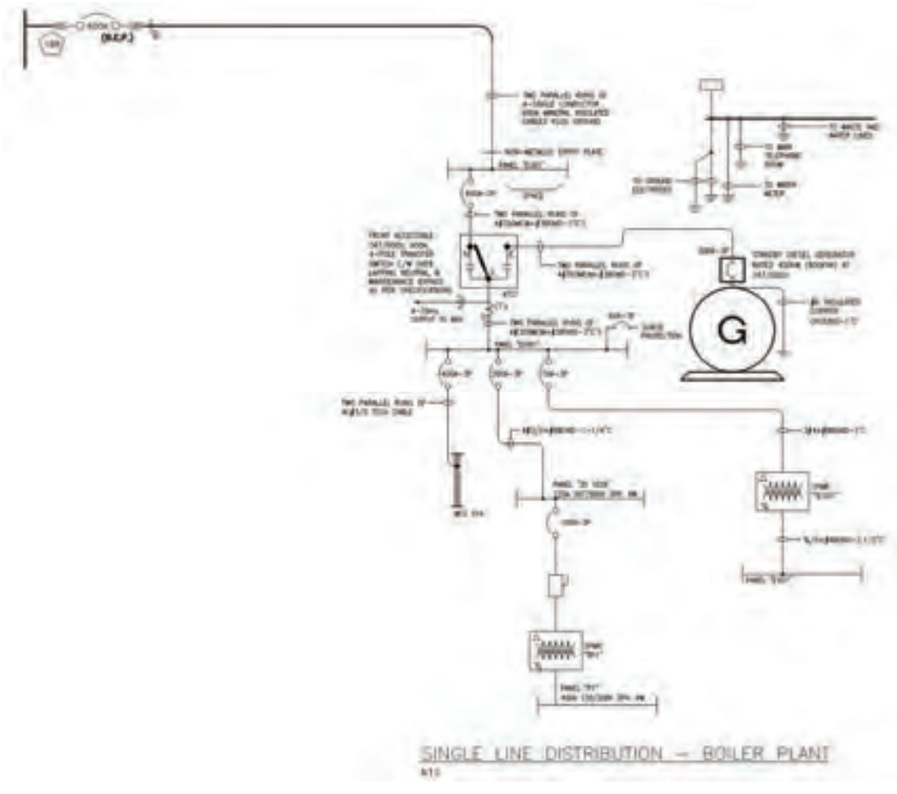
Now recall that there is several hundred kWs of power being exported to the new emergency department. Once this department expansion goes ahead, then this capacity will be returned to the core infrastructure of the infirmary electrical distribution system to be utilized.

Boiler Plant:

A 600V normal power feeder (with backup emergency power) is extended over from switchboard 1A to a new distribution center in the sub basement level of the power plant building.

In addition to this normal / emergency power feeder a local generator is installed in the sub basement to act as the primary source of emergency power. This second generator was added to reduce the emergency load on the infirmary emergency power distribution system, should only one generator every come-on line. It is more import to ensure the infirmary (the acute care center) is serviced with emergency power first.

There is sufficient capacity in both the normal power feeder and the emergency power system to accommodate a fairly large expansion to the plant load – we can safely handle 200kWs of load growth.



4.4 Electrical Report

Emergency Department Expansion:

Normal Power:

The existing Halifax Infirmary electrical service was utilized, as an interim measure, to provide normal and emergency power to accommodate the present emergency department.

- The emergency department has a 400A conditional branch circuit extended over from switchboard 1B.
    - This service only has sufficient capacity to address the current emergency department needs and was not designed to accommodate future growth.
- The emergency department has a 400A vital branch circuit extended over from switchboard 2B.
    - This service only has sufficient capacity to address the current emergency department needs and was not designed to accommodate future growth.
- The emergency department has a 250A vital branch circuit (feeding the emergency department UPS system) extended over from switchboard 2B.
    - This service only has sufficient capacity to address the current emergency department needs and was not designed to accommodate future growth.

The existing Halifax Infirmary electrical service lacks enough spare capacity to serve the proposed expansion Emergency Department. The design of the Emergency Department expansion in 2007 included provision for a new electrical service to accommodate the proposed expansion. A new pull pit and concrete encased duct bank were installed on the property; these will become part of the new high voltage underground service from an NSPI switching cubicle on Summer Street to new pad-mounted transformers. New conduits were installed from an Emergency Department electrical room through the exterior wall; these will become part of the new low voltage underground service from the pad-mounted transformers to a new service entrance switchboard in the electrical room.

Emergency Power:

The three existing 1500 kW Halifax Infirmary standby diesel generators lack enough spare capacity to serve the proposed expansion. New generator(s) and bypass isolation automatic transfer switch(es) will be installed in the new expansion.

Telecommunications:

A voice and data communications infrastructure was installed at the Halifax Infirmary in accordance with the standards that applied at the time of construction. The infrastructure is still standard compliant, but the cabling cannot support the high speed networks that have been developed in recent years.

A new structured wiring system will be installed in the proposed expansion in accordance with the *ANSI/TIA-1179-2010 Healthcare Facility Telecommunications Infrastructure Standard*. Telecommunications Rooms will be installed on every floor. Backbone voice and data cables will interconnect these rooms; horizontal voice and data cables will be routed from these rooms to the work areas in the spaces they serve.

The Halifax Infirmary voice services are supplied from the Telephone Equipment Room in the sub-basement of the Abbie J. Lane Building. It lacks the spare capacity to serve the proposed expansion. A plan to serve the proposed expansion will be developed in consultation with Capital Health's Information Technology Department.

A new backbone data cable will connect the new data communications infrastructure to the existing Halifax Infirmary local area network.

Fire Alarm:

The existing Halifax Infirmary fire alarm system consists of a network of Simplex 4100 series control panels. Additional control panels will be installed in the proposed expansion and connected to the existing network.

Electronic Access Control:

The facility has an IP-based card access system that permits staff with ID cards access to designated areas through secure doors. It consists of a server, database software, monitoring software, control panels, and peripheral devices. These peripheral devices include card readers, digital keypads, door contacts, motion sensors, alarm buttons, door strikes, and magnetic locks. The server and control panels are connected to the Capital Health LAN/WAN.

The access control system will be extended into the new expansion. New control panels will be installed and connected to the LAN, and new peripheral devices will be connected to the control panels.

Security:

Existing security and CCTV surveillance systems are obsolete. New systems will be installed in the proposed expansion to meet Capital Health's requirements.

Nurse Call:

Existing systems are obsolete. New systems will be installed in the proposed expansion to meet Capital Health's requirements.

4.5 Halifax Infirmary (HI) Existing Building Statistics

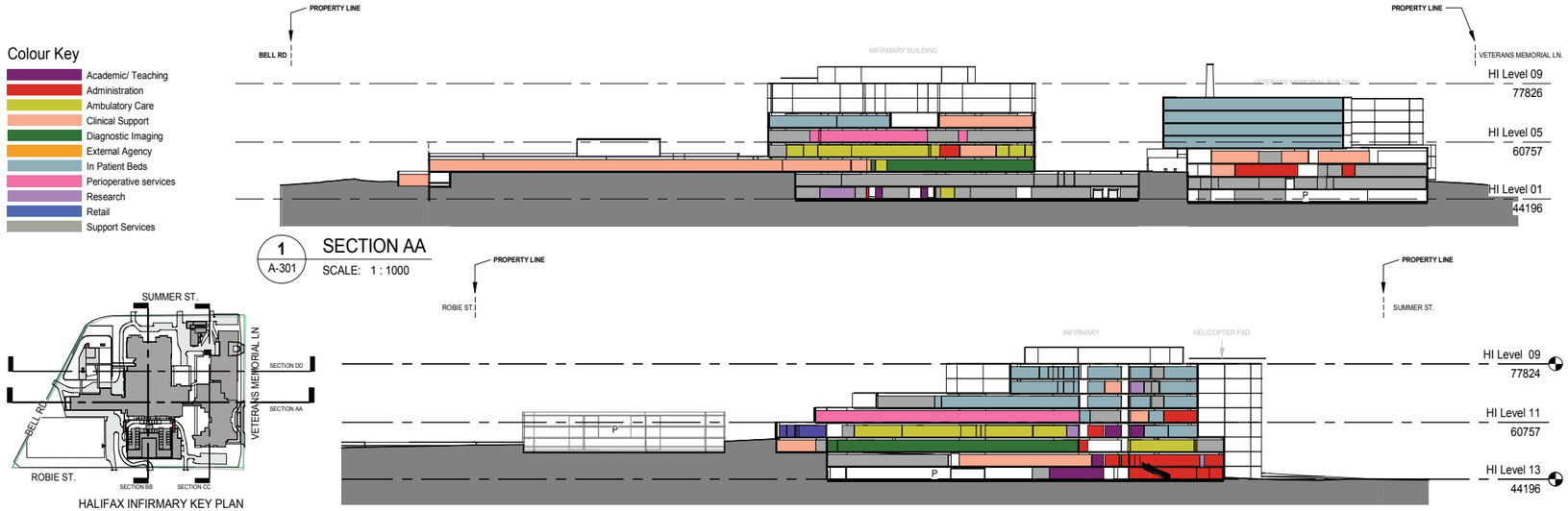


Fig. 402 Section - Halifax Infirmary Campus

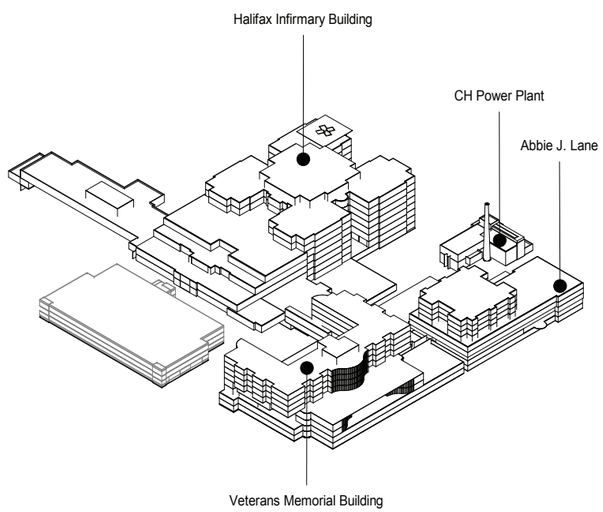


Fig. 403 Gross Floor Area (GFA) - Halifax Infirmary Site

GFA - Halifax Infirmary	
Level	Area
LEVEL 01	114,982 SF
LEVEL 02	95,349 SF
LEVEL 03	188,842 SF
LEVEL 04	154,294 SF
LEVEL 05	146,612 SF
LEVEL 06	135,776 SF
LEVEL 07	56,447 SF
LEVEL 08	56,433 SF
Total	948,734 SF

GFA - Abbie J. Lane	
Level	Area
LEVEL 01	37,384 SF
LEVEL 02	44,320 SF
LEVEL 03	30,139 SF
LEVEL 04	34,776 SF
LEVEL 05	11,098 SF
LEVEL 06	13,799 SF
LEVEL 07	13,736 SF
LEVEL 08	13,736 SF
LEVEL 09	13,736 SF
Total	212,724 SF

*Include underground parking levels

GFA - Veterans Memorial...	
Level	Area
LEVEL 01	42,517 SF
LEVEL 02	41,119 SF
LEVEL 03	30,403 SF
LEVEL 04	30,403 SF
LEVEL 05	30,524 SF
LEVEL 06	30,524 SF
LEVEL P1	77,283 SF
LEVEL P2	68,780 SF
Total	351,551 SF

*Include underground parking levels and kitchen

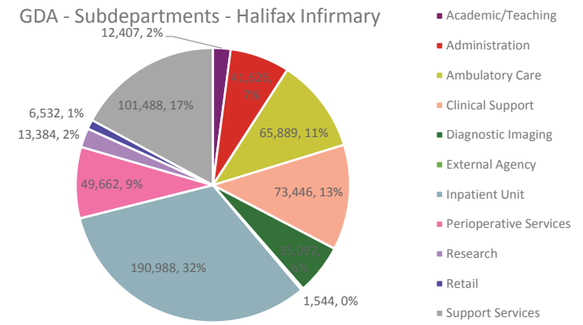


Fig. 404 GDA Subdepartments - Halifax Infirmary Building

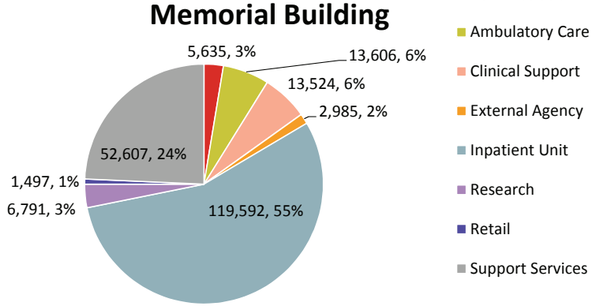


Fig. 405 GDA Subdepartments - Veterans Memorial Building

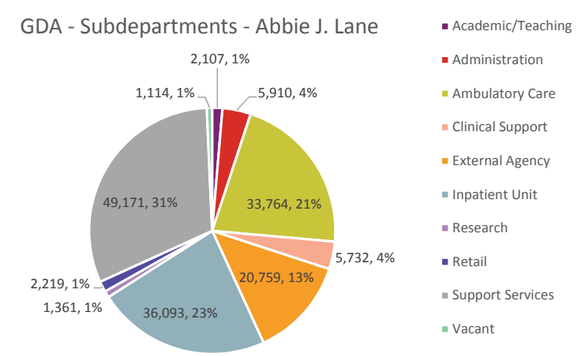
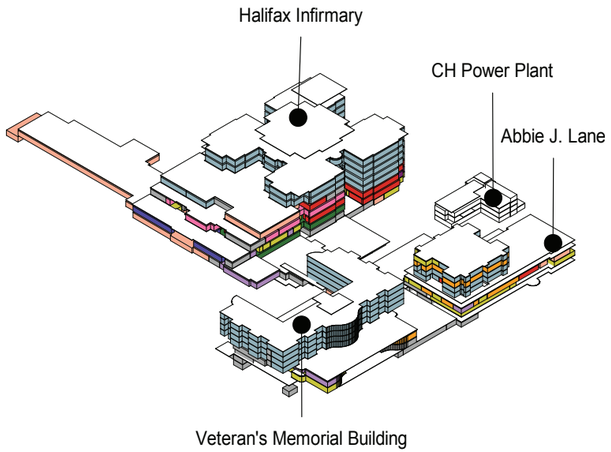


Fig. 406 GDA Subdepartments - Abbie J. Lane Building

4.5 Halifax Infirmary (HI) Existing Building Statistics



Halifax Infirmary Site

GDA - Subdepartments - Halifax Infirmary

Department	Sub-department	Area
Academic/Teaching	Academic/Teaching	12,407 SF
	Subtotal	12,407 SF
Administration	Corporate administration	10,475 SF
Administration	Foundation/ volunteers and auxiliary support	429 SF
Administration	Medical offices	30,722 SF
	Subtotal	41,626 SF
Ambulatory Care	Ambulatory procedure unit	5,966 SF
Ambulatory Care	Clinics	32,436 SF
Ambulatory Care	Dialysis	8,274 SF
Ambulatory Care	Heart health	16,333 SF
Ambulatory Care	Rehab	2,880 SF
	Subtotal	65,889 SF
Clinical Support	Ancillary	1,736 SF
Clinical Support	Emergency	50,602 SF
Clinical Support	Laboratory	11,371 SF
Clinical Support	Pharmacy	8,026 SF
Clinical Support	Respiratory	1,711 SF
		73,446 SF
	Subtotal	
Diagnostic Imaging	Diagnostic Imaging	35,092 SF
		35,092 SF
	Subtotal	
External Agency	External Agency	1,544 SF
		1,544 SF
	Subtotal	
Inpatient Unit	Critical Care	77,149 SF
Inpatient Unit	Medical/Surgical Units	113,839 SF
		190,988 SF
	Subtotal	
Perioperative Services	Perioperative Services	49,662 SF
		49,662 SF
	Subtotal	
Research	Research	13,384 SF
		13,384 SF
	Subtotal	
Retail	Retail	6,532 SF
		6,532 SF
	Subtotal	
Support Services	Bio Med Engineering	4,494 SF
Support Services	Facility management	1,531 SF
Support Services	Food Services	13,068 SF
Support Services	Health information/ service registration	2,612 SF
Support Services	IT	589 SF
Support Services	M+E	46,235 SF
Support Services	MDR	19,211 SF
Support Services	Security	939 SF
Support Services	Staff services (lockers etc)	11,858 SF
Support Services	Supply chain (warehouse), procurement	952 SF
	Subtotal	101,488 SF
Total		592,058 SF

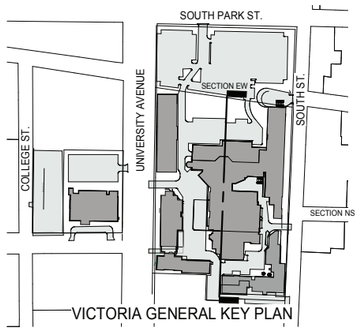
GDA - Subdepartments - Abbie J. Lane

Department	Sub-department	Area
Academic/Teaching	Academic/Teaching	2,107 SF
	Subtotal	2,107 SF
Administration	Corporate administration	922 SF
Administration	Medical offices	4,988 SF
	Subtotal	5,910 SF
Ambulatory Care	Clinics	5,957 SF
Ambulatory Care	Mental health	27,497 SF
	Subtotal	33,454 SF
Clinical Support	Rehab	5,732 SF
	Subtotal	5,732 SF
External Agency	External Agency	20,759 SF
	Subtotal	20,759 SF
Inpatient Unit	Continuing care	9,398 SF
Inpatient Unit	Mental health	26,291 SF
	Subtotal	35,689 SF
Research	Research	1,361 SF
	Subtotal	1,361 SF
Retail	Retail	2,219 SF
	Subtotal	2,219 SF
Support Services	Environmental services (house keeping/ laundry/ waste management etc)	3,959 SF
Support Services	Facility management	10,155 SF
Support Services	Food/ nutrition services	886 SF
Support Services	IT	8,453 SF
Support Services	M+E	17,402 SF
Support Services	Security	527 SF
Support Services	Staff services (lockers etc)	387 SF
Support Services	Supply chain (warehouse), procurement	8,154 SF
	Subtotal	49,923 SF
Vacant		1,075 SF
	Subtotal	1,075 SF
Total		158,229 SF

GDA - Subdepartments - Veteran's Memorial...

Department	Sub-department	Area
Administration	Corporate Admin	3,593 SF
Administration	Foundation/ volunteers and auxiliary support	966 SF
Administration	HR/ occupational health	1,077 SF
	Subtotal	5,635 SF
Ambulatory Care	Clinics	13,606 SF
	Subtotal	13,606 SF
Clinical Support	Ancillary (Spiritual Care)	1,950 SF
Clinical Support	Rehab	11,573 SF
	Subtotal	13,524 SF
External Agency	External Agency	2,985 SF
	Subtotal	2,985 SF
Inpatient Unit	Continuing care	118,386 SF
	Subtotal	118,386 SF
Research	Research	6,791 SF
	Subtotal	6,791 SF
Retail	Retail	1,497 SF
	Subtotal	1,497 SF
Support Services	Environmental services (house keeping/ laundry/ waste management etc)	346 SF
Support Services	Facility management	8,605 SF
Support Services	Food Services	31,797 SF
Support Services	M+E	9,422 SF
Support Services	Staff services (lockers etc)	2,777 SF
Support Services	Supply chain (warehouse), procurement	636 SF
	Subtotal	53,583 SF
Total		216,007 SF

Fig. 407 Gross Department Area - Halifax Infirmary Site



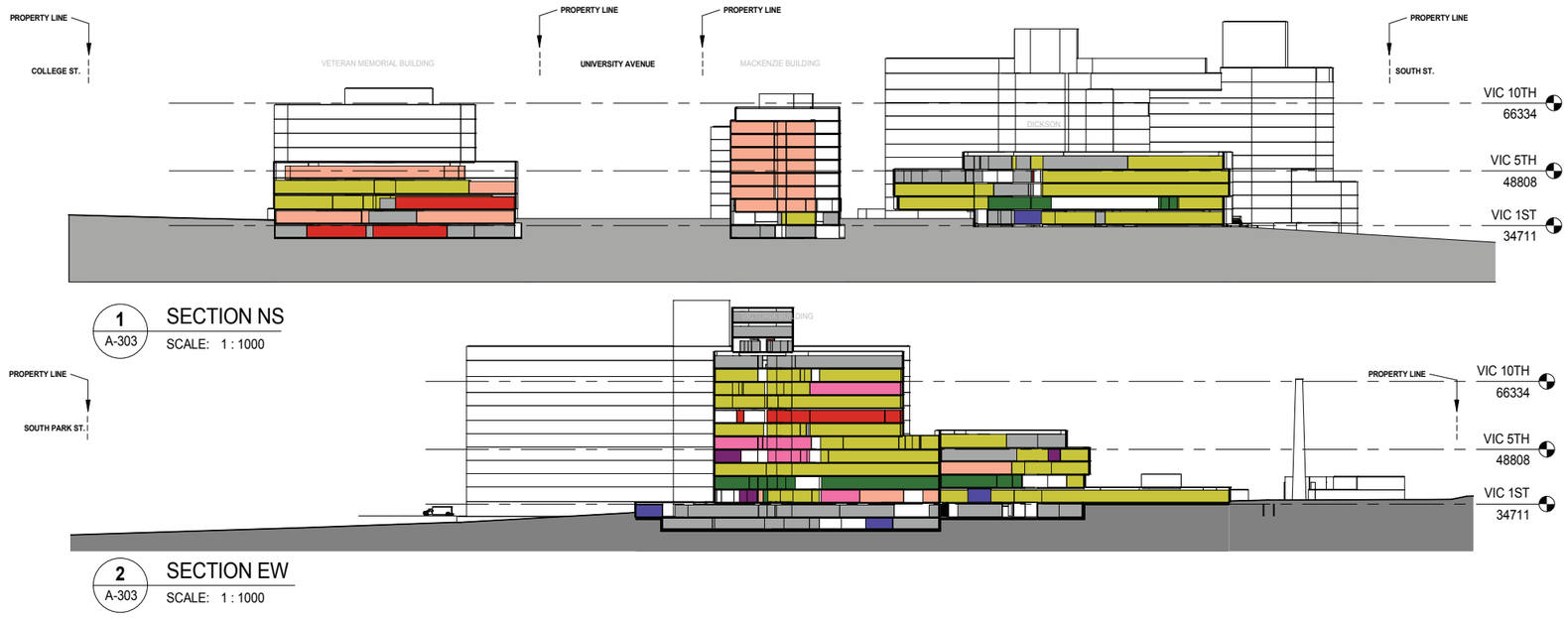


Fig. 408 Section - Victoria General Site

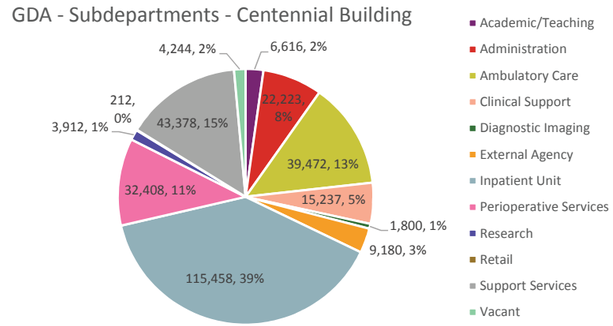


Fig. 409 GDA Subdepartments - Centennial Building

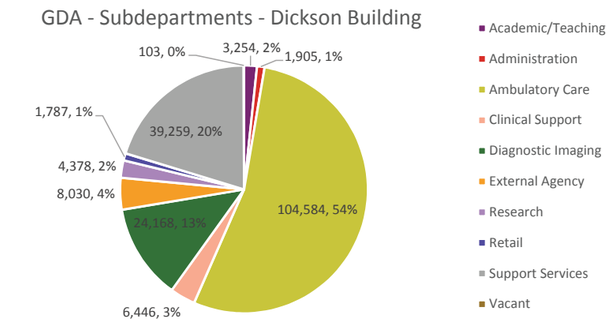


Fig. 410 GDA Subdepartments - Dickson Building

4.6 Victoria General (VG) Existing Building Statistics

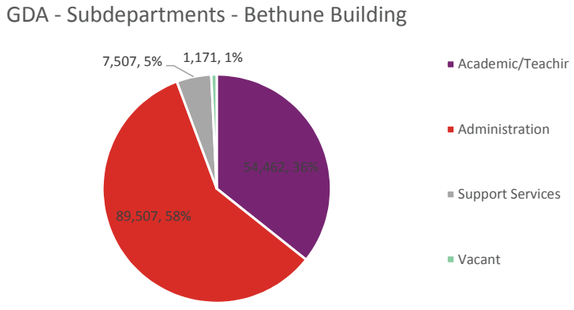


Fig. 411 GDA Subdepartments - Bethune Building

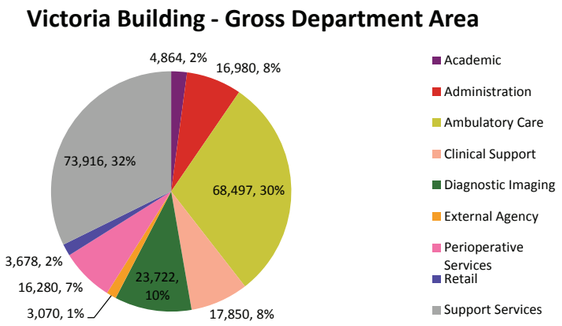


Fig. 412 GDA Subdepartments - Victoria Building

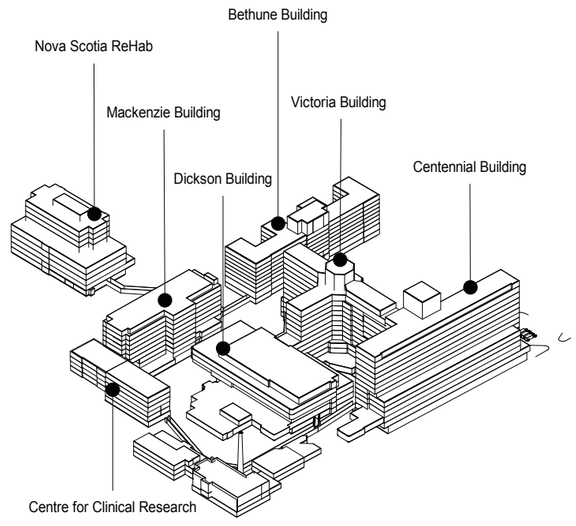


Fig. 413 Gross Floor Area (GFA) - Victoria General Site

GFA - Victoria Building	
Level	Area
LEVEL 0B	30,747 SF
LEVEL 01	48,600 SF
LEVEL 02	24,098 SF
LEVEL 03	23,739 SF
LEVEL 04	16,533 SF
LEVEL 05	16,533 SF
LEVEL 06	16,521 SF
LEVEL 07	13,479 SF
LEVEL 08	13,479 SF
LEVEL 09	13,444 SF
LEVEL 10	13,365 SF
LEVEL 11	13,412 SF
LEVEL 12	15,826 SF
LEVEL 13	9,786 SF
LEVEL 14	2,116 SF
LEVEL 15	2,112 SF
Roof	2,162 SF
Total	275,950 SF

GFA - Centennial Building	
Level	Area
LEVEL 0B	29,488 SF
LEVEL 0G	30,847 SF
LEVEL 01	30,357 SF
LEVEL 02	28,156 SF
LEVEL 03	28,604 SF
LEVEL 04	28,686 SF
LEVEL 05	21,183 SF
LEVEL 06	21,274 SF
LEVEL 07	23,087 SF
LEVEL 08	23,087 SF
LEVEL 09	23,087 SF
LEVEL 10	23,112 SF
LEVEL 11	23,087 SF
LEVEL 12	20,728 SF
LEVEL 13	1,548 SF
LEVEL 14	1,548 SF
Total	357,878 SF

GFA - Mackenzie	
Level	Area
LEVEL 0B	17,838 SF
LEVEL 01	17,038 SF
LEVEL 02	18,074 SF
LEVEL 03	18,074 SF
LEVEL 04	18,074 SF
LEVEL 05	17,978 SF
LEVEL 06	18,038 SF
LEVEL 07	17,993 SF
LEVEL 08	14,898 SF
LEVEL SB	17,092 SF
Total	175,095 SF

GFA - Bethune Building	
Level	Area
LEVEL 0B	25,740 SF
LEVEL 01	20,728 SF
LEVEL 02	36,817 SF
LEVEL 03	18,408 SF
LEVEL 04	36,799 SF
LEVEL 05	18,408 SF
LEVEL 06	18,408 SF
LEVEL 07	18,408 SF
LEVEL 08	18,408 SF
LEVEL 09	2,305 SF
LEVEL 10	2,310 SF
LEVEL 11	2,320 SF
Total	219,061 SF

GFA - Nova Scotia ReHab	
Level	Area
LEVEL 0G	21,006 SF
LEVEL 01	25,702 SF
LEVEL 02	20,480 SF
LEVEL 03	20,466 SF
LEVEL 04	10,233 SF
LEVEL 05	11,210 SF
LEVEL 06	11,210 SF
LEVEL 07	11,210 SF
LEVEL 08	11,210 SF
Total	142,726 SF

GFA - Dickson Building	
Level	Area
LEVEL 01	30,692 SF
LEVEL 02	48,550 SF
LEVEL 03	39,892 SF
LEVEL 04	34,176 SF
LEVEL 05	35,218 SF
LEVEL 06	22,587 SF
Total	211,115 SF

GFA - Centre for Clinical Research	
Level	Area
LEVEL 0B	12,169 SF
LEVEL 01	11,759 SF
LEVEL 02	11,787 SF
LEVEL 03	11,782 SF
LEVEL 04	6,207 SF
LEVEL SB	6,381 SF
Total	60,087 SF

4.6 Victoria General (VG) Existing Building Statistics

Section Sub-Heading

GDA - Subdepartments - Victoria Building

Department	Sub-department		Area
Academic/Teaching	Academic/Teaching		4,864 SF
		Subtotal	4,864 SF
Administration	Corporate Administration		4,688 SF
Administration	Medical offices		12,292 SF
		Subtotal	16,980 SF
Ambulatory Care	Ambulatory procedure unit		5,438 SF
Ambulatory Care	Cancer care		14,382 SF
Ambulatory Care	Clinics		21,905 SF
Ambulatory Care	Dialysis		3,318 SF
Ambulatory Care	Medical day care		15,549 SF
Ambulatory Care	Perioperative day surgery		7,906 SF
		Subtotal	68,497 SF
Clinical Support	Ancillary (Spiritual Care), patient support		644 SF
Clinical Support	Laboratory		1,425 SF
Clinical Support	Pharmacy		15,781 SF
		Subtotal	17,850 SF
Diagnostic Imaging	Diagnostic Imaging		23,722 SF
		Subtotal	23,722 SF
External Agency	External Agency		3,070 SF
		Subtotal	3,070 SF
Perioperative Services	Perioperative Services		16,280 SF
		Subtotal	16,280 SF
Research	Research		249 SF
		Subtotal	249 SF
Retail	Retail		3,678 SF
		Subtotal	3,678 SF
Support Services	Environmental services (house keeping/ laundry/ waste management etc)		1,820 SF
Support Services	Facility management		3,851 SF
Support Services	Food Services		27,943 SF
Support Services	IT		1,537 SF
Support Services	M+E		8,901 SF
Support Services	MDR		11,325 SF
Support Services	Portering services & mail		392 SF
Support Services	Supply chain (warehouse), procurement		7,042 SF
Support Services	Supply chain (warehouse), procurement, MDR		11,106 SF
		Subtotal	73,916 SF
Vacant	Vacant		1,552 SF
		Subtotal	1,552 SF
Total			230,658 SF

GDA - Subdepartments - Centre for Clinical Research

Department	Sub-department		Area
Clinical Support	Laboratory		4,077 SF
		Subtotal	4,077 SF
External Agency	External Agency		18,952 SF
		Subtotal	18,952 SF
Research	Research		31,490 SF
		Subtotal	31,490 SF
Support Services	Bio Med Engineering		683 SF
Support Services	M+E		1,102 SF
Support Services	Portering services & mail		227 SF
Support Services	Staff services (lockers etc)		501 SF
		Subtotal	2,513 SF
Total			57,032 SF

GDA - Subdepartments - Centennial Building

Department	Sub-department		Area
Academic/Teaching	Academic/Teaching		6,616 SF
		Subtotal	6,616 SF
Administration	Corporate Administration		12,229 SF
Administration	Finance		2,684 SF
Administration	Foundation/ volunteers and auxiliary support		2,325 SF
Administration	HR/ Occupational health		1,574 SF
Administration	Medical offices		3,278 SF
		Subtotal	22,090 SF
Ambulatory Care	Cancer care		9,702 SF
Ambulatory Care	Clinic		7,074 SF
Ambulatory Care	Perioperative day surgery		22,783 SF
		Subtotal	39,559 SF
Clinical Support	Ancillary (Spiritual Care, patient support)		1,102 SF
Clinical Support	Laboratory		3,641 SF
Clinical Support	Pharmacy		7,789 SF
Clinical Support	Rehab		352 SF
Clinical Support	Respiratory		2,353 SF
		Subtotal	15,237 SF
Diagnostic Imaging	Diagnostic Imaging		1,800 SF
		Subtotal	1,800 SF
External Agency	External Agency		9,180 SF
		Subtotal	9,180 SF
Inpatient Unit	ALC		12,578 SF
Inpatient Unit	Cancer care		43,404 SF
Inpatient Unit	Critical Care		9,977 SF
Inpatient Unit	Medical/Surgical Units		34,894 SF
Inpatient Unit	Palliative Care		13,506 SF
Inpatient Unit	Rehab		138 SF
		Subtotal	114,498 SF
Perioperative Services	Perioperative Services		32,408 SF
		Subtotal	32,408 SF
Research	Research		3,912 SF
		Subtotal	3,912 SF
Retail	Retail		212 SF
		Subtotal	212 SF
Support Services	Environmental services (house keeping/ laundry/ waste management etc)		9,389 SF
Support Services	Facility management		2,392 SF
Support Services	Food Services		1,765 SF
Support Services	Health information/ service registration		290 SF
Support Services	M+E		23,501 SF
Support Services	Staff services (lockers etc)		1,054 SF
Support Services	Supply chain (warehouse), procurement		6,077 SF
		Subtotal	44,468 SF
Vacant	Vacant		4,244 SF
		Subtotal	4,244 SF
Total			294,223 SF

GDA - Subdepartments - Dickson Building

Department	Sub-department		Area
Academic/Teaching	Academic/Teaching		3,254 SF
		Subtotal	3,254 SF
Administration	Corporate Administration		1,905 SF
		Subtotal	1,905 SF
Ambulatory Care	Cancer care		1,270 SF
Ambulatory Care	Clinic		88,171 SF
Ambulatory Care	Dialysis		15,144 SF
		Subtotal	104,584 SF
Clinical Support	Rehab		4,781 SF
Clinical Support	Respiratory		1,665 SF
		Subtotal	6,446 SF
Diagnostic Imaging	Diagnostic Imaging		24,168 SF
		Subtotal	24,168 SF
External Agency	External Agency		8,030 SF
		Subtotal	8,030 SF
Research	Research		4,378 SF
		Subtotal	4,378 SF
Retail	Retail		1,787 SF
		Subtotal	1,787 SF
Support Services	Bio Med Engineering		6,245 SF
Support Services	Facility management		8,530 SF
Support Services	Food Services		5,860 SF
Support Services	Health information/ service registration		7,668 SF
Support Services	IT		171 SF
Support Services	M+E		5,949 SF
Support Services	Staff services (lockers etc)		2,730 SF
Support Services	Supply chain (warehouse), procurement		2,107 SF
		Subtotal	39,259 SF
TBD	TBD		103 SF
		Subtotal	103 SF
Total			193,914 SF

GDA - Subdepartments - Mackenzie

Department	Sub-department		Area
Academic/Teaching	Academic/Teaching		584 SF
		Subtotal	584 SF
Ambulatory Care	Rehab		1,655 SF
		Subtotal	1,655 SF
Clinical Support	Health Services		6,347 SF
Clinical Support	Laboratory (morgue etc)		91,807 SF
		Subtotal	98,154 SF
Support Services	Facility management		388 SF
Support Services	Staff services		7,798 SF
Support Services	Supply chain (warehouse), procurement		2,740 SF
		Subtotal	10,926 SF
Vacant	Vacant		14,898 SF
		Subtotal	14,898 SF
Total			126,216 SF

GDA - Subdepartments - Nova Scotia ReHab

Department	Sub-department		Area
Academic/Teaching	Academic/Teaching		1,208 SF
		Subtotal	1,208 SF
Administration	Corporate Administration		3,420 SF
Administration	Medical offices		9,156 SF
		Subtotal	12,576 SF
Ambulatory Care	Rehab		26,830 SF
		Subtotal	26,830 SF
Clinical Support	Rehab		28,403 SF
		Subtotal	28,403 SF
Diagnostic Imaging	Diagnostic Imaging		1,528 SF
		Subtotal	1,528 SF
External Agency	External Agency		1,830 SF
		Subtotal	1,830 SF
Inpatient Unit	Rehab		30,206 SF
		Subtotal	30,206 SF
Research	Research		2,994 SF
		Subtotal	2,994 SF
Support Services	Food Services		3,895 SF
Support Services	M+E		6,060 SF
Support Services	Portering services & mail		113 SF
Support Services	Security		48 SF
Support Services	Staff services (lockers etc)		1,066 SF
Support Services	Supply chain (warehouse), procurement		7,245 SF
		Subtotal	18,427 SF
Vacant	Vacant		600 SF
		Subtotal	600 SF
Total			124,602 SF

GDA - Subdepartments - Bethune Building

Department	Sub-department		Area
Academic/Teaching	Academic/Teaching		54,462 SF
		Subtotal	54,462 SF
Administration	Corporate Administration		21,793 SF
Administration	Finance		14,005 SF
Administration	Foundation/ volunteers and auxiliary support		9,043 SF
Administration	HR/ occupational health		16,916 SF
Administration	Medical offices		11,276 SF
Administration	PR		16,474 SF
		Subtotal	89,507 SF
Support Services	Corporate Administration		132 SF
Support Services	M+E		544 SF
Support Services	Supply chain (warehouse), procurement		6,831 SF
		Subtotal	7,507 SF
Vacant	Vacant		1,171 SF
		Subtotal	1,171 SF
Total			152,646 SF

Fig. 414 Victoria General Gross Department Area

5

Site Opportunities & Long Term Growth Patterns

5.1 Site Opportunities & Long Term Growth Patterns

A series of explorations on how the site may evolve from a simple massing redevelopment perspective was completed early on to help identify opportunities for redevelopment and to illustrate the importance of understanding the relationship between decisions to locate the Tier 1 priority programs and the future potential redevelopment phases on the site. This exercise illustrated that a variety of site redevelopment phasing strategies are possible which allow the site to be replaced in a logical, long term sequence, thus justifying the cost of investing on the site in the immediate term.

Similarly, each site was evaluated from a test fit perspective to determine how primary drivers such as inpatient unit sizes and optimal floor plate sizes work within the existing site context. Several exploratory massing concepts roughly based on the anticipated program areas and required adjacencies were explored to begin the test fit of potential massing solutions for two sites.

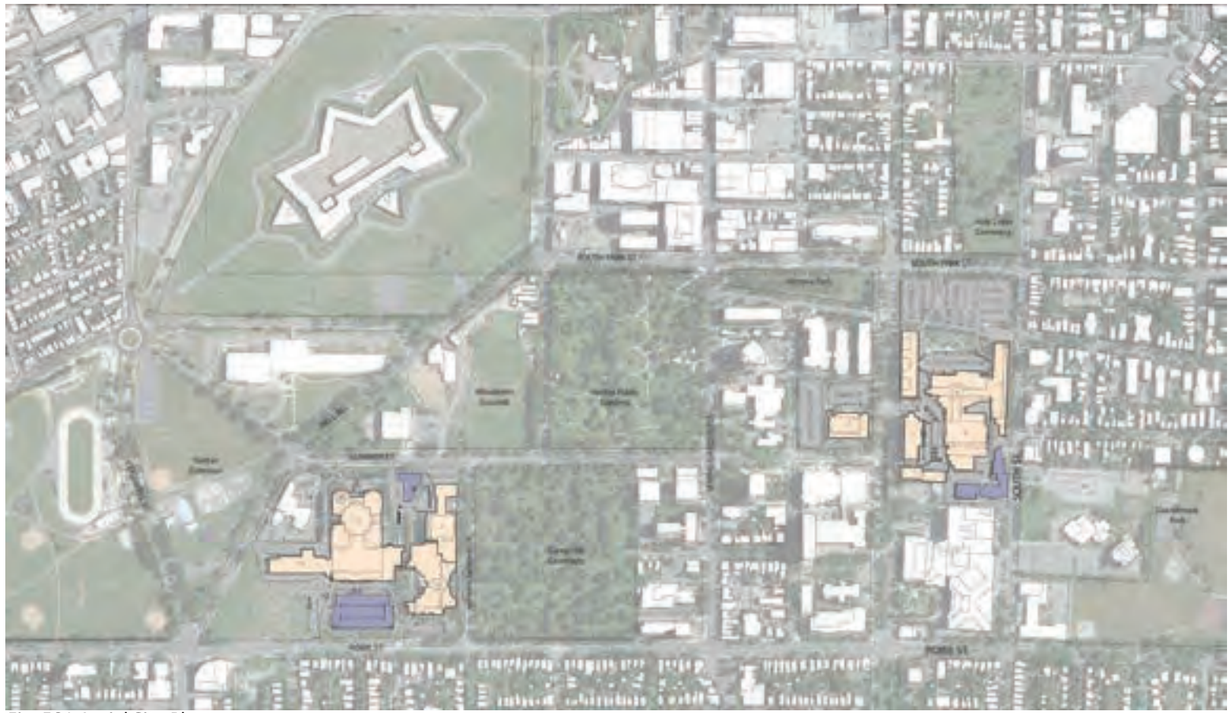


Fig. 501 Aerial Site Plan

5.1 Site Opportunities & Long Term Growth Patterns

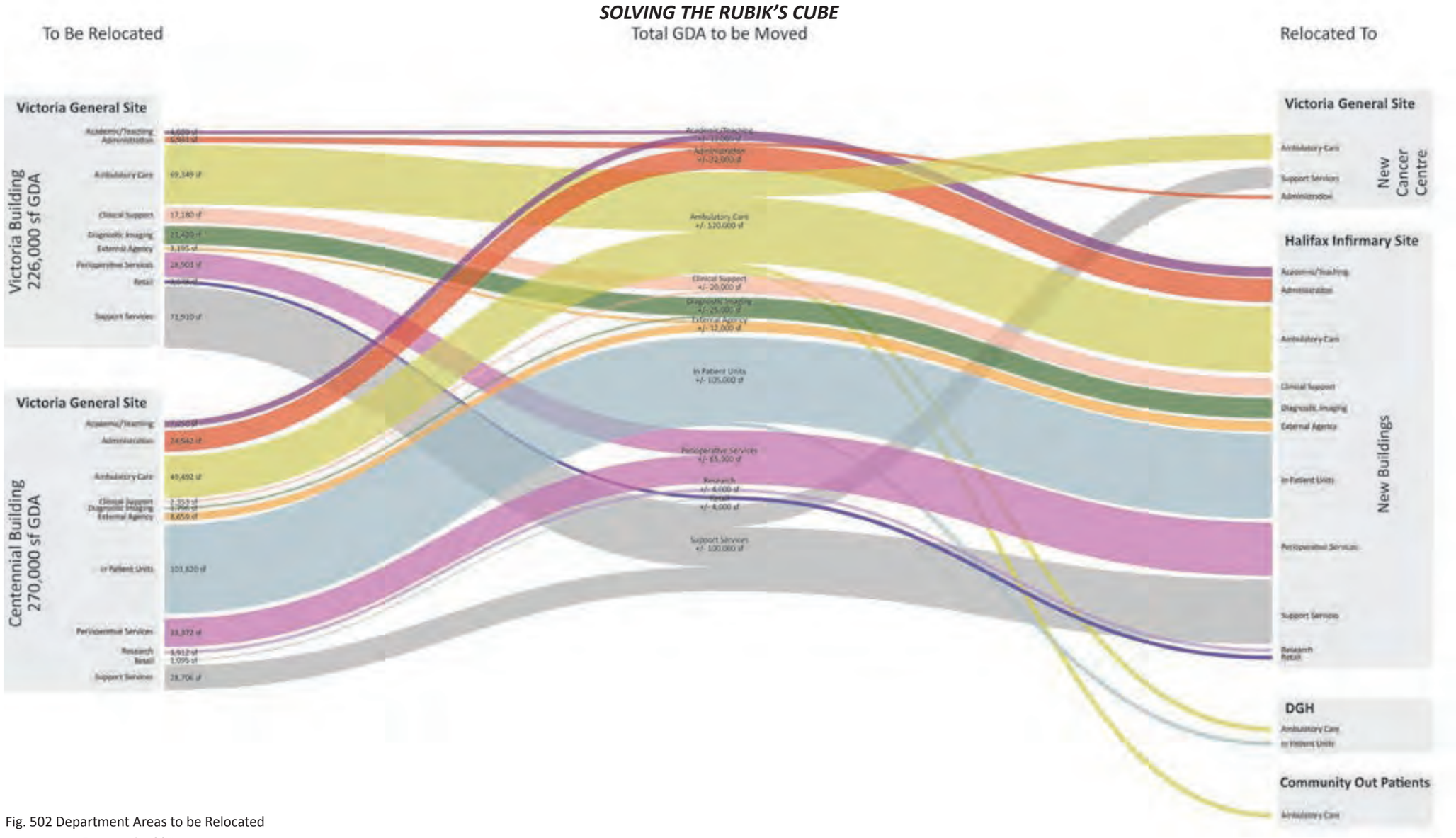


Fig. 502 Department Areas to be Relocated

5.2 Halifax Infirmary (HI) Site

5.2.1. Halifax Infirmary Site Explorations

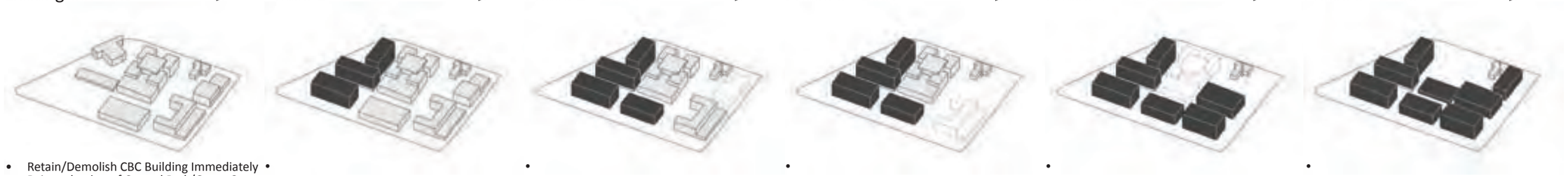


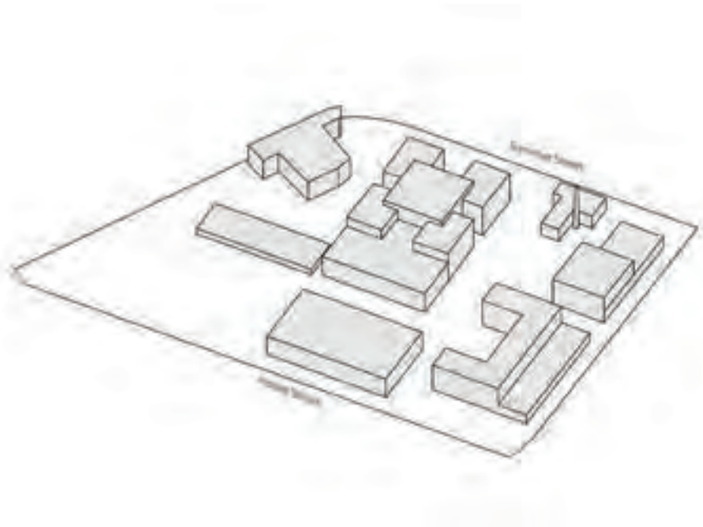
Fig. 503 Halifax Infirmary Site Explorations

5.2 Halifax Infirmary (HI) Site

5.2.2. Halifax Infirmary Exploration A

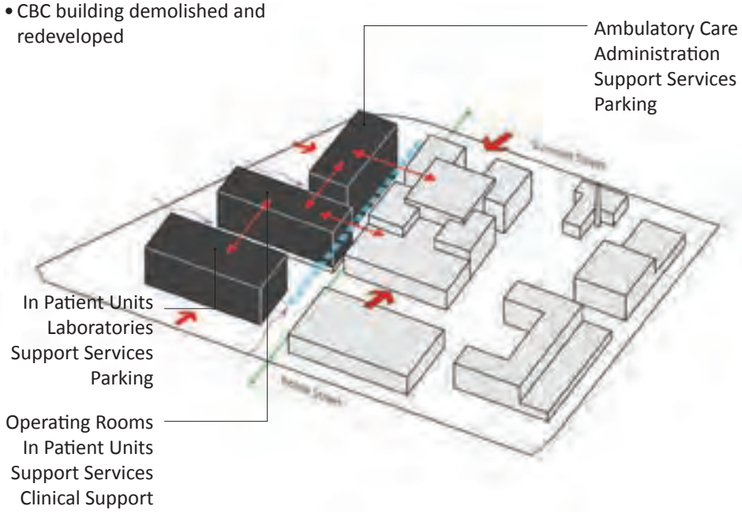
- Retain/Demolish CBC Building Immediately
- Reintroduction of Central Park/Green Space
- New Main Entrance Along Robie Street
- Connected Buildings
- Circular Redevelopment Process
- Permeable Site - Multiple Entrances

Existing Context



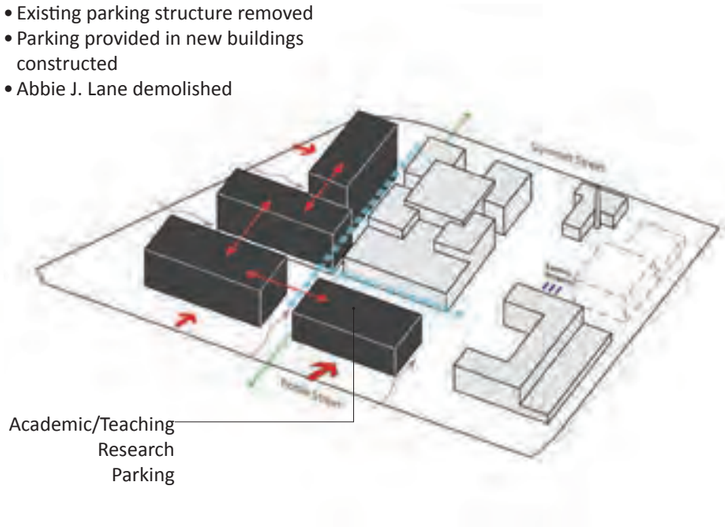
Phase 1 - 2022

- CBC building demolished and redeveloped



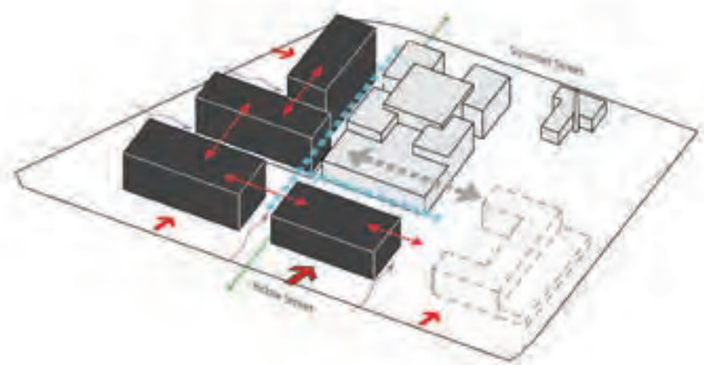
Phase 2 - 2030

- Existing parking structure removed
- Parking provided in new buildings constructed
- Abbie J. Lane demolished



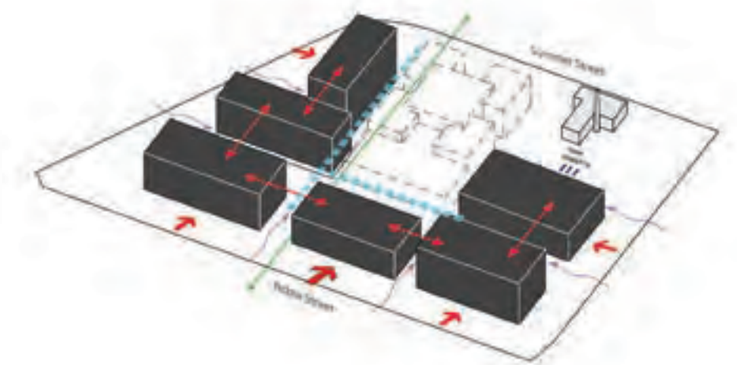
Phase 3 - 2037

- Veterans Memorial building demolished



Phase 4 - 2045

- Halifax Infirmary demolished
- New IP and other activities required to replace HI building



Phase 5 - 2055+

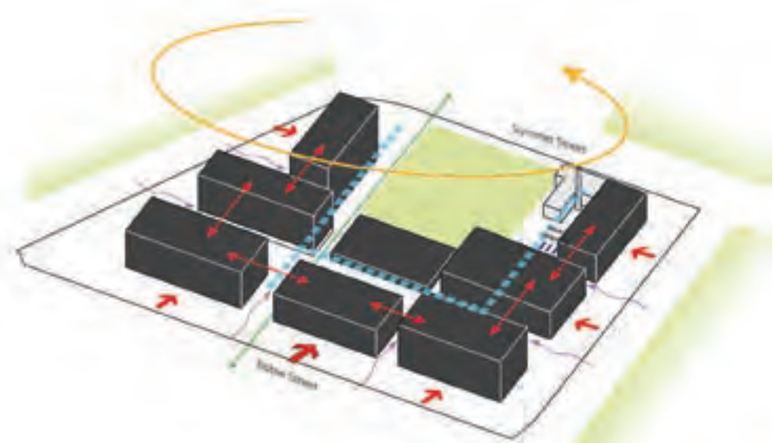


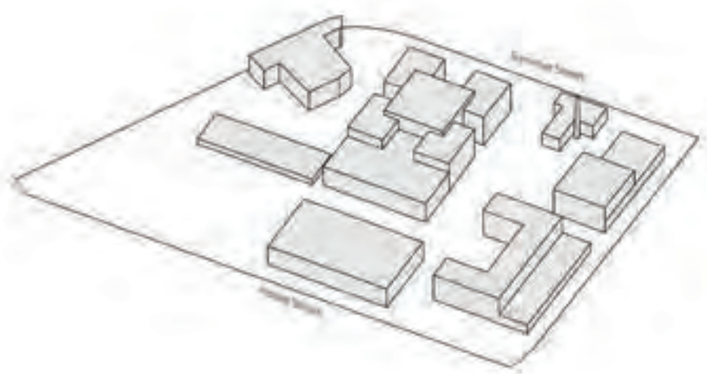
Fig. 504 Halifax Infirmary Site Exploration A

5.2 Halifax Infirmary (HI) Site

5.2.3. Halifax Infirmary Exploration B

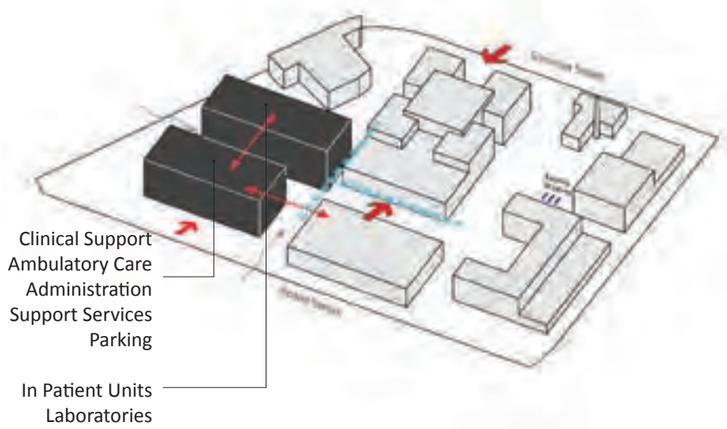
- Retain CBC Building to 2030
- Central Courtyard/Green Space
- New Main Entrance Along Summer Street
- Connected Buildings
- Permeable Site

Existing Context



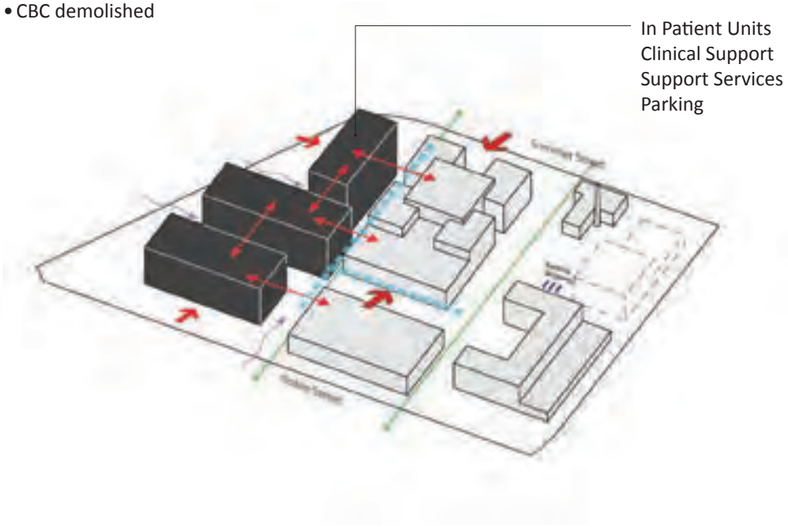
Phase 1 - 2022

- Urban Farm relocated to VG site



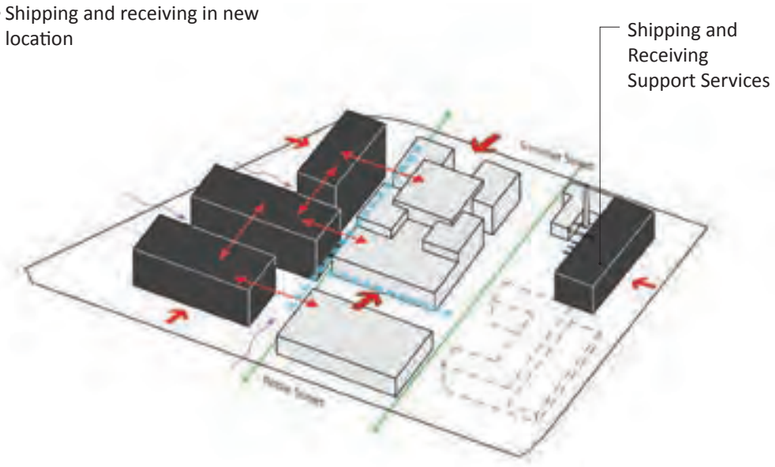
Phase 2 - 2030

- CBC demolished

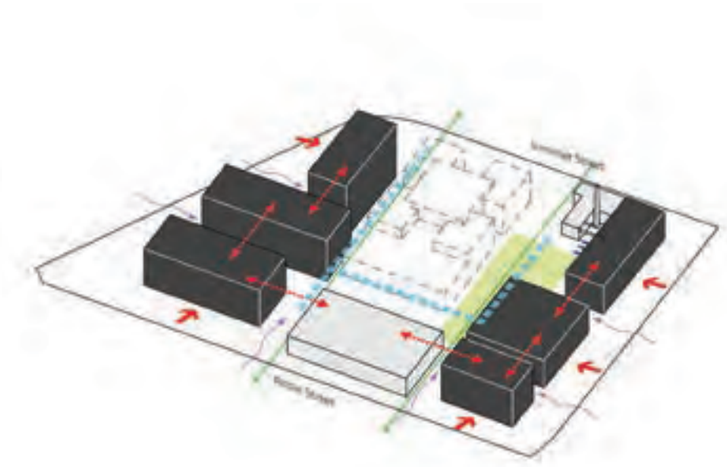


Phase 3 - 2037

- Shipping and receiving in new location



Phase 4 - 2045



Phase 5 - 2055+

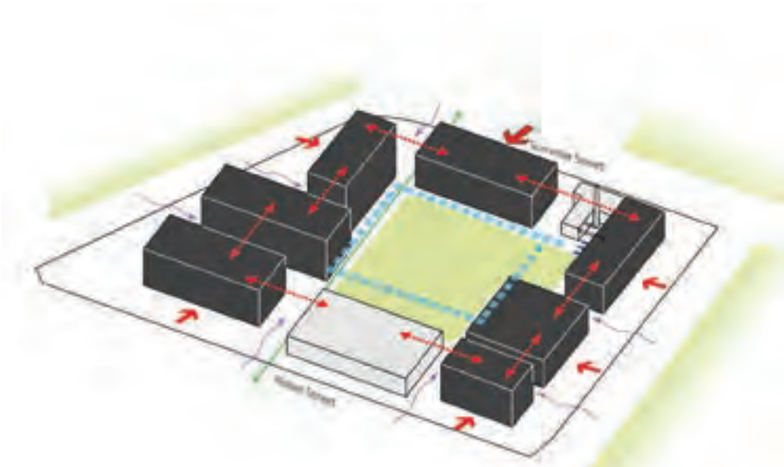


Fig. 505 Halifax Infirmary Site Exploration B

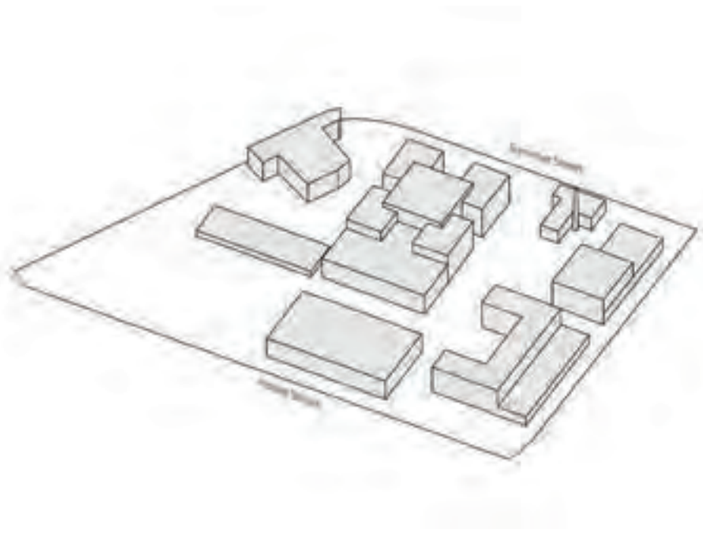
kasian

5.2 Halifax Infirmary (HI) Site

5.2.4. Halifax Infirmary Exploration C

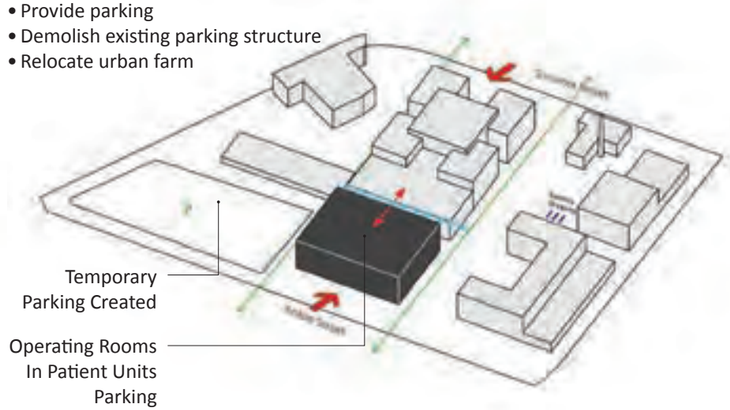
- Parks/Public Space throughout Site
- New Main Entrance Along Robie Street
- Connected Buildings
- New and Expanded CH Power Plant
- Reaffirm Central Spine
- Permeable Site

Existing Context



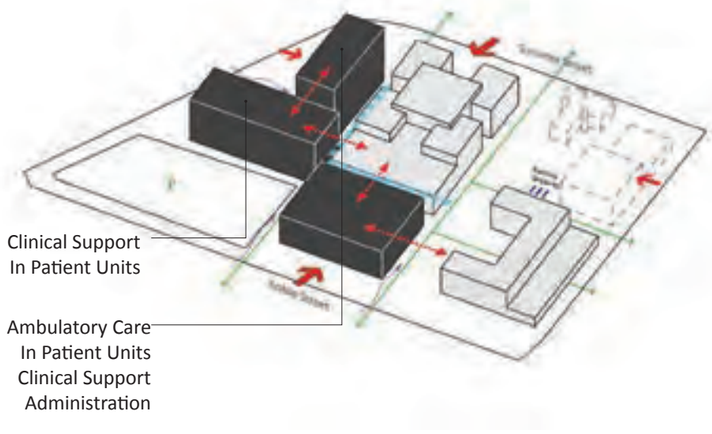
Phase 1 - 2022

- CBC retained
- Create temporary parking at Bell Rd. and Robie St.
- Provide new OR and IP block
- Provide parking
- Demolish existing parking structure
- Relocate urban farm



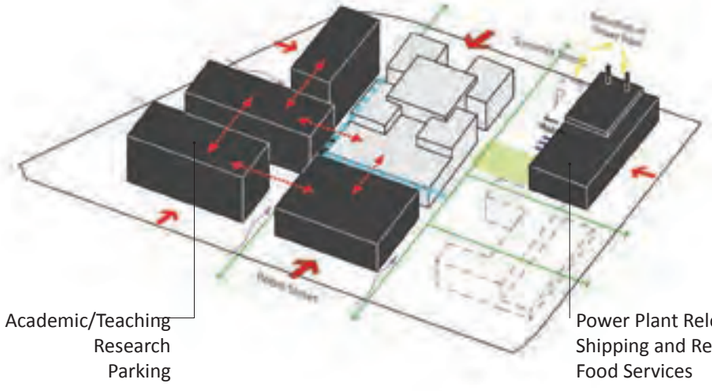
Phase 2 - 2022/2030 ?

- 2030 Abbie J. Lane demolished
- CBC demolished



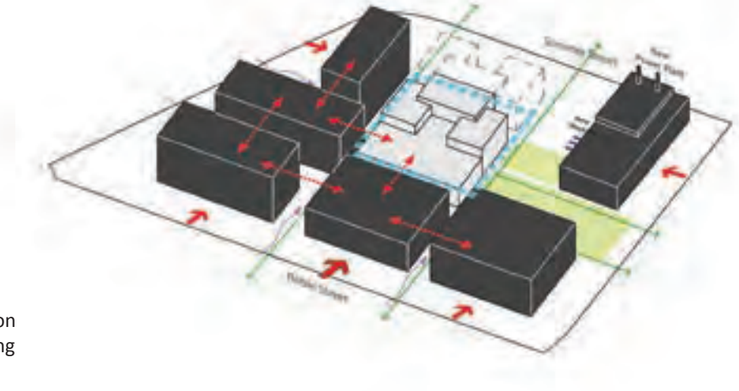
Phase 3 - 2037

- CH Central Plant expanded, centralized or decentralized



Phase 4 - 2045

- Construct new building on Veterans Memorial site to accommodate the partial demolition of the Halifax Infirmary block



Phase 5 - 2055+

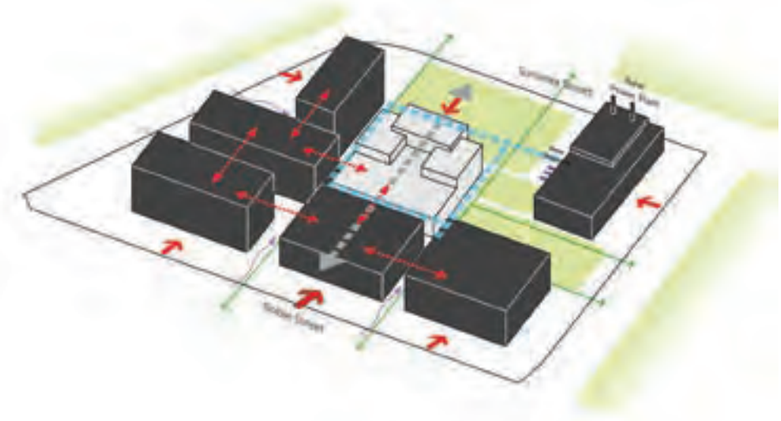


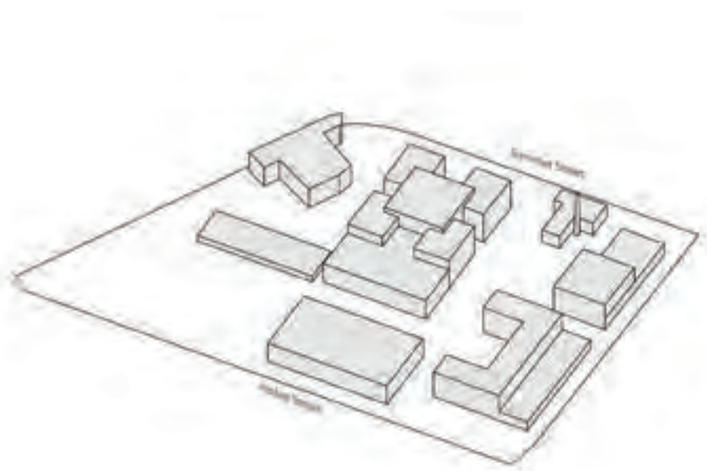
Fig. 506 Halifax Infirmary Site Exploration C

5.2 Halifax Infirmary (HI) Site

5.2.5. Halifax Infirmary Exploration D

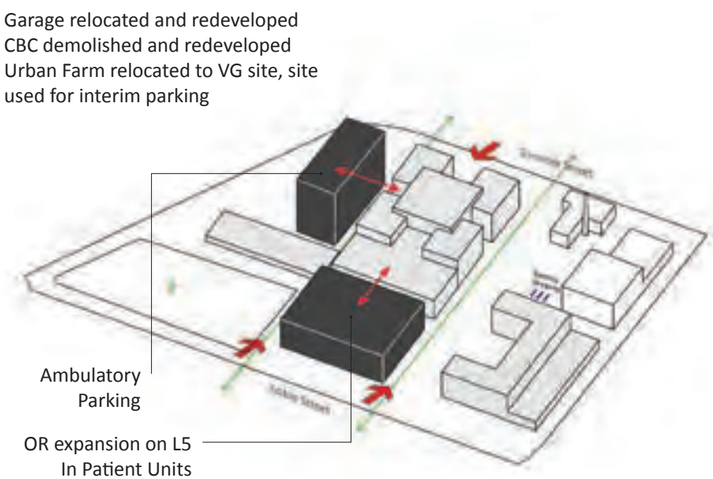
- Relocate Garage Immediately
- Demolish CBC Building Immediately
- Connect with the Existing Common
- New Main Entrance Along Summer Street
- Permeable Site / Multiple Entrance
- OR Expansion on to Existing L5

Existing Context



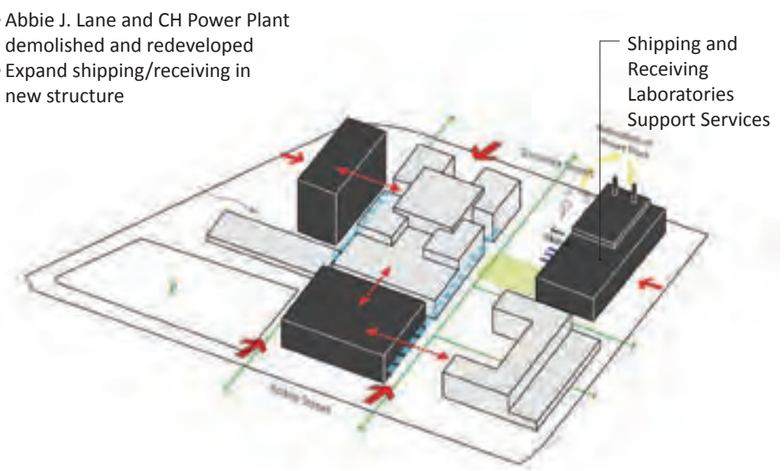
Phase 1 - 2022

- Garage relocated and redeveloped
- CBC demolished and redeveloped
- Urban Farm relocated to VG site, site used for interim parking



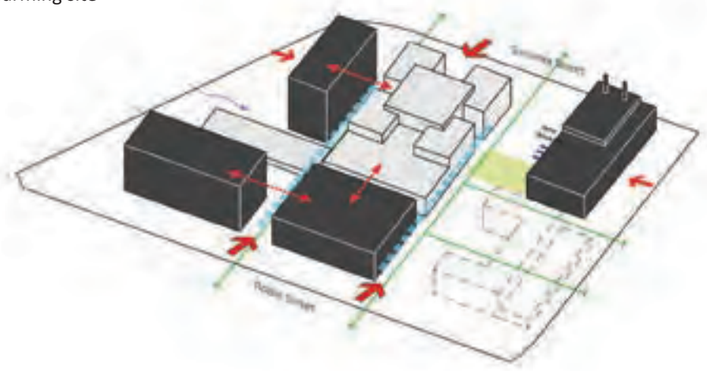
Phase 2 - 2030

- Abbie J. Lane and CH Power Plant demolished and redeveloped
- Expand shipping/receiving in new structure



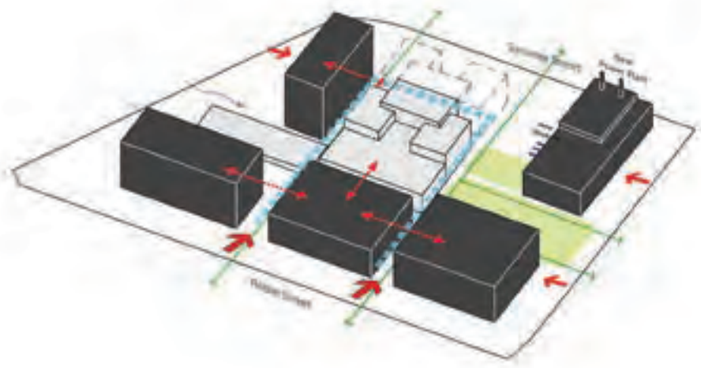
Phase 3 - 2037

- Demolish Veterans Memorial Building
- New construction on old urban farming site



Phase 4 - 2045

- Part of HI demolished



Phase 5 - 2055+

- Garden park developed
- Development over existing Emergency and Trauma centre possible

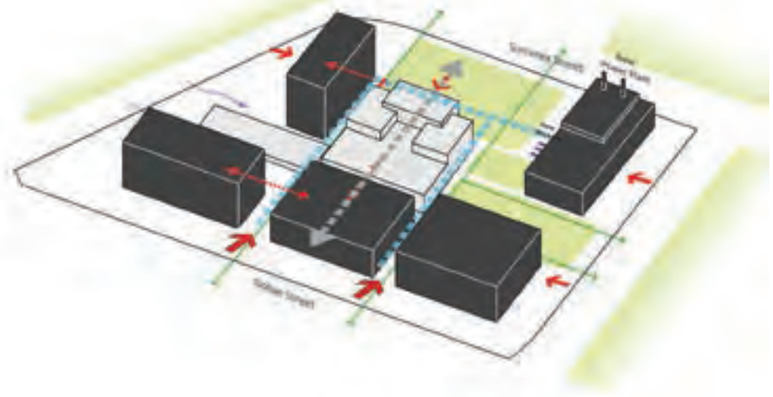
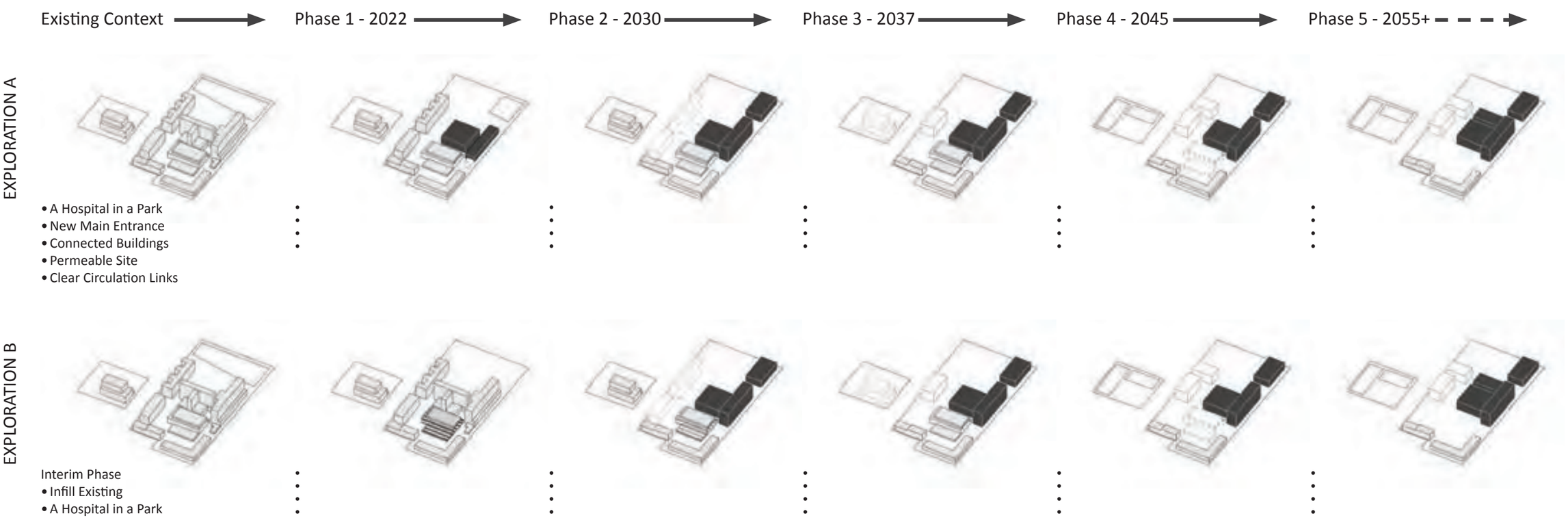


Fig. 507 Halifax Infirmary Site Exploration D

5.3 Victoria General (VG) Site

5.3.1. Victoria General Site Explorations



Exploration B - Interim Expansion into Dickson

- Total Dickson DGF +/- 195,000 sf

Non Cancer Care function in Dickson excluding support to be moved to HI/Community

1.	Rehabilitation	+/- 4,700 sf
2.	Respiratory	+/- 1,600 sf
3.	External Agencies	+/- 8,000 sf
4.	Administration	+/- 7,700 sf
5.	Research Pain Clinic	+/- 4,000 sf
6.	Ambulatory Care - Dialysis Clinic	+/- 16,500 sf
	Total	**+/- 42,000 sf**

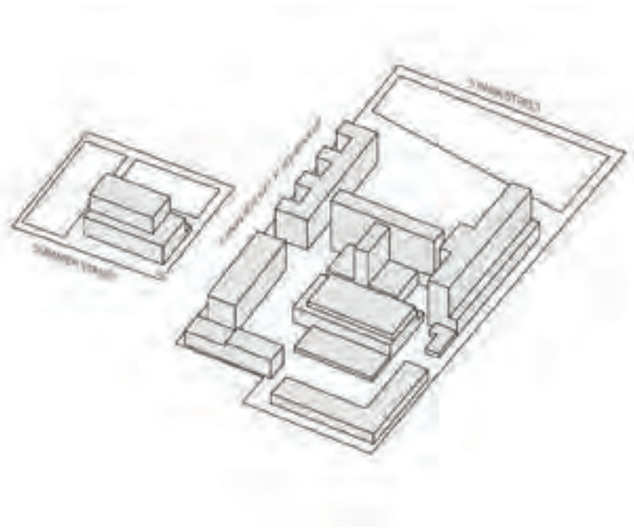
Fig. 508 Victoria General Site Explorations

5.3 Victoria General (VG) Site

5.3.2. Victoria General Exploration A

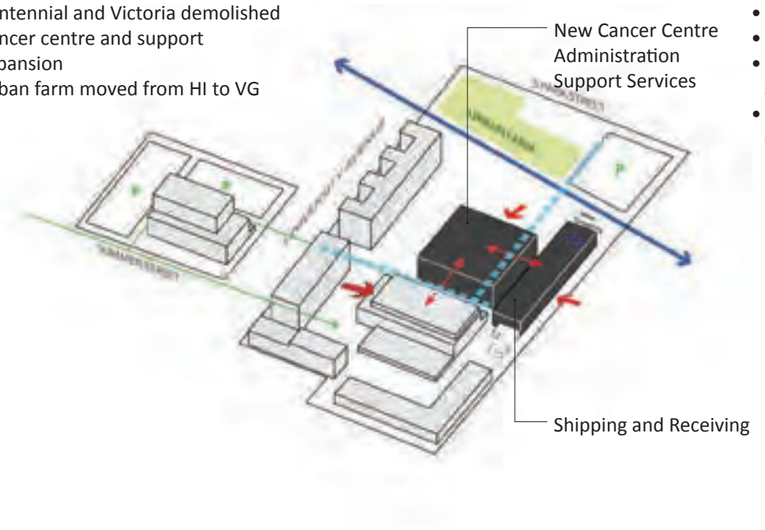
- A Hospital in a Park
- New Main Entrance
- Connected Buildings
- Permeable Site
- Clear Circulation Links

Existing Context



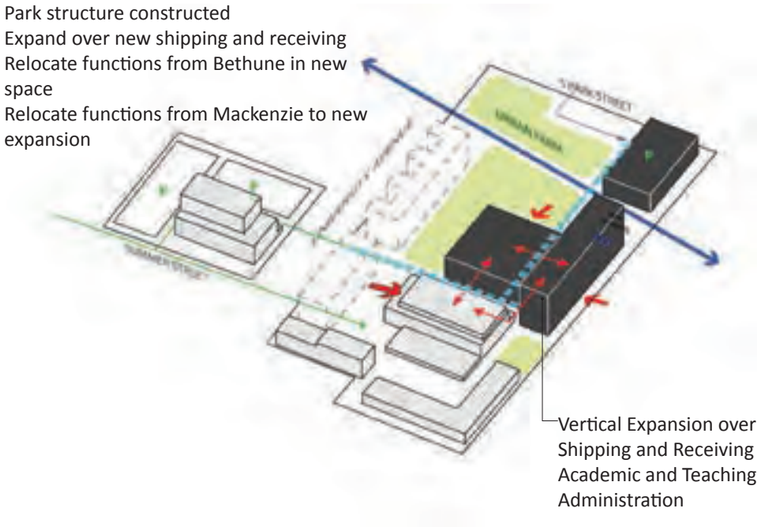
Phase 1 - 2022

- Centennial and Victoria demolished
- Cancer centre and support expansion
- Urban farm moved from HI to VG



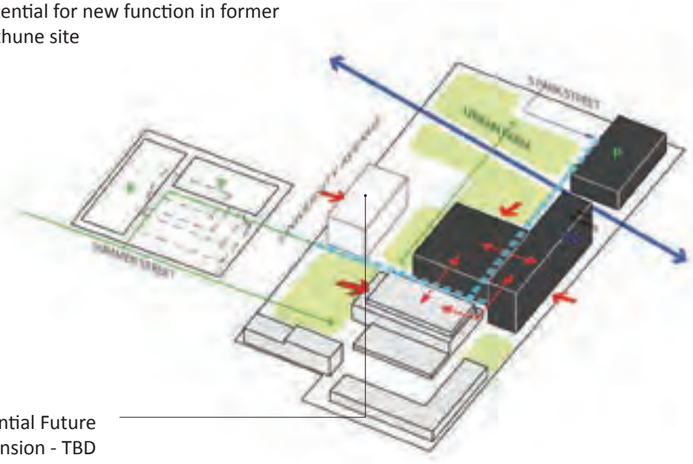
Phase 2 - 2030

- Park structure constructed
- Expand over new shipping and receiving
- Relocate functions from Bethune in new space
- Relocate functions from Mackenzie to new expansion



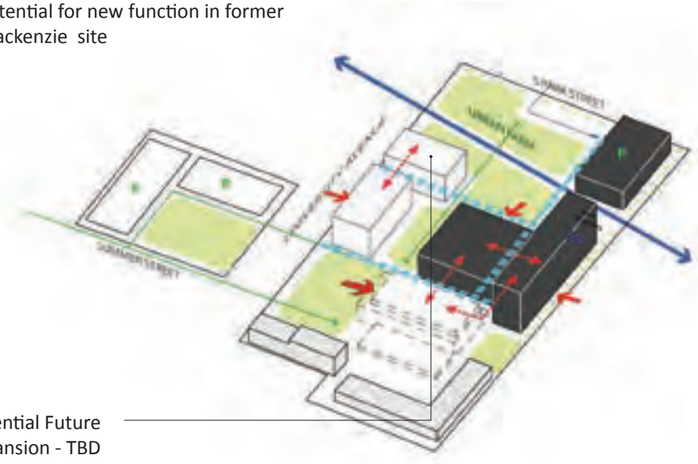
Phase 3 - 2037

- Potential for new function in former Bethune site



Phase 4 - 2045

- Potential for new function in former Mackenzie site



Phase 4 - 2045

- Relocate functions from Dickson to new site East of New Cancer Centre

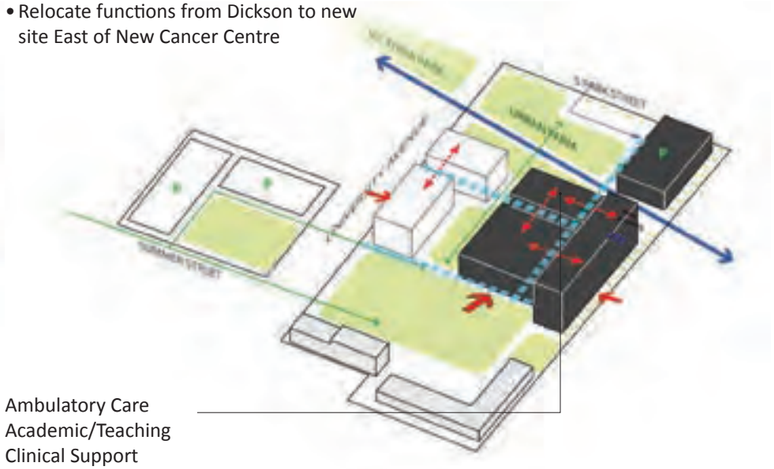


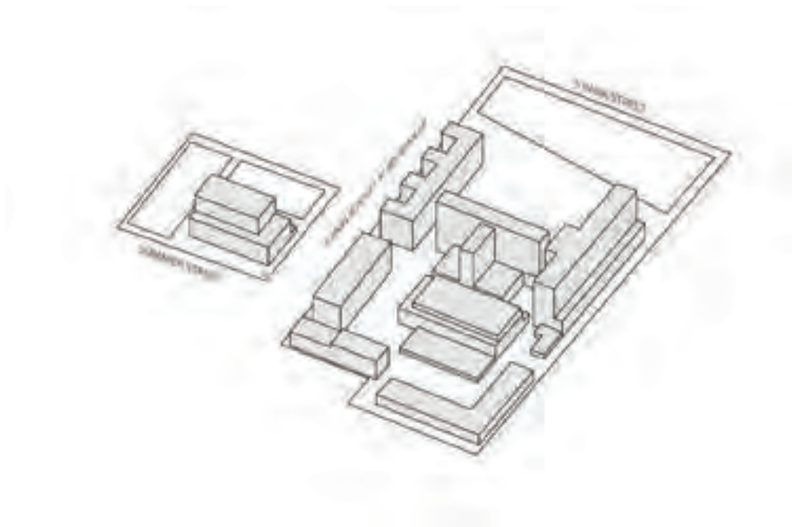
Fig. 509 Victoria General Site Exploration A

5.3 Victoria General (VG) Site

5.3.3. Victoria General Exploration B - Interim Option

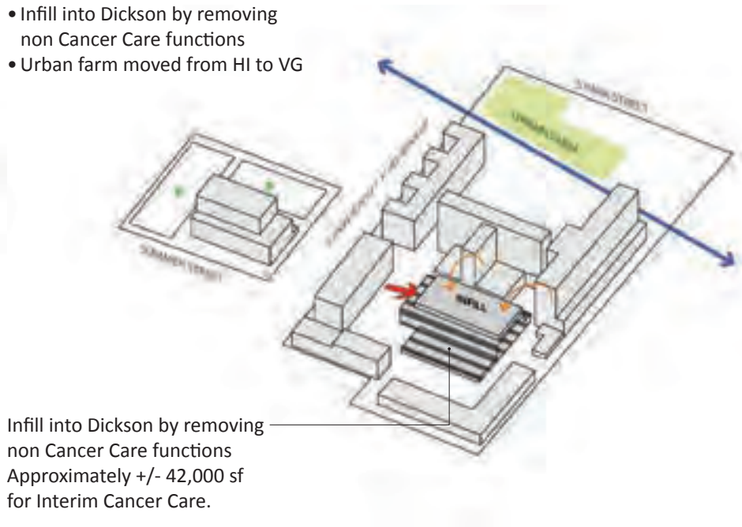
- Infill Existing by Removal of Non Cancer Care Functions
- A Hospital in a Park
- New Main Entrance
- Connected Buildings
- Permeable Site
- Clear Circulation Links

Existing Context



Phase 1 - 2022

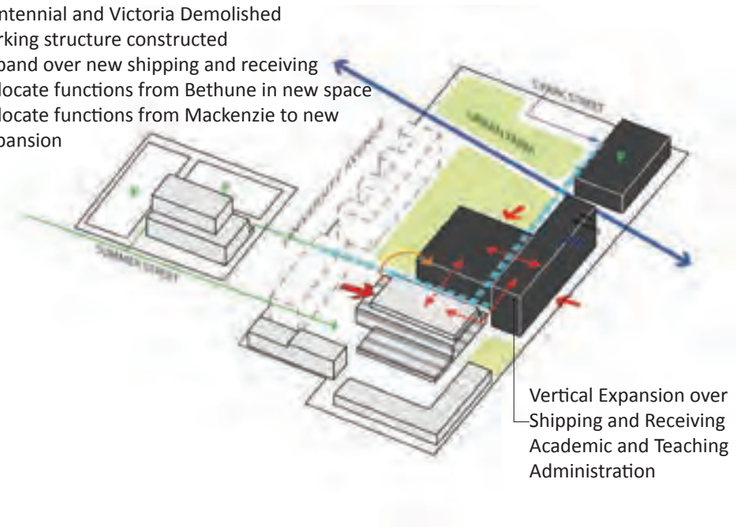
- Infill into Dickson by removing non Cancer Care functions
- Urban farm moved from HI to VG



Infill into Dickson by removing non Cancer Care functions
Approximately +/- 42,000 sf for Interim Cancer Care.

Phase 2 - 2030

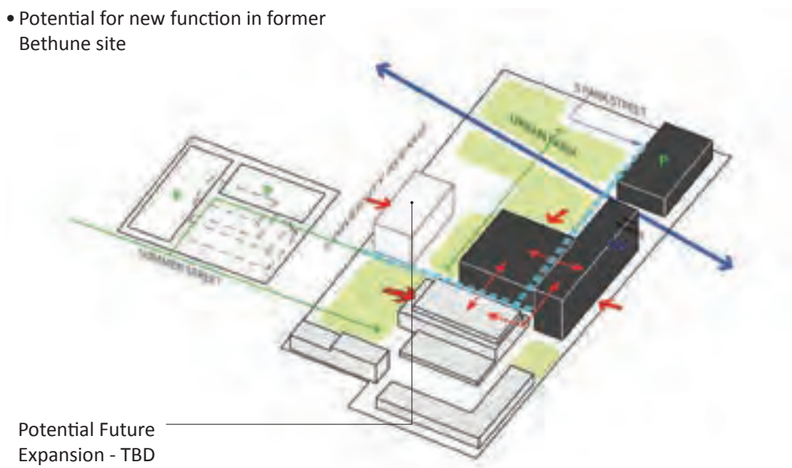
- Centennial and Victoria Demolished
- Parking structure constructed
- Expand over new shipping and receiving
- Relocate functions from Bethune in new space
- Relocate functions from Mackenzie to new expansion



Vertical Expansion over
Shipping and Receiving
Academic and Teaching
Administration

Phase 3 - 2037

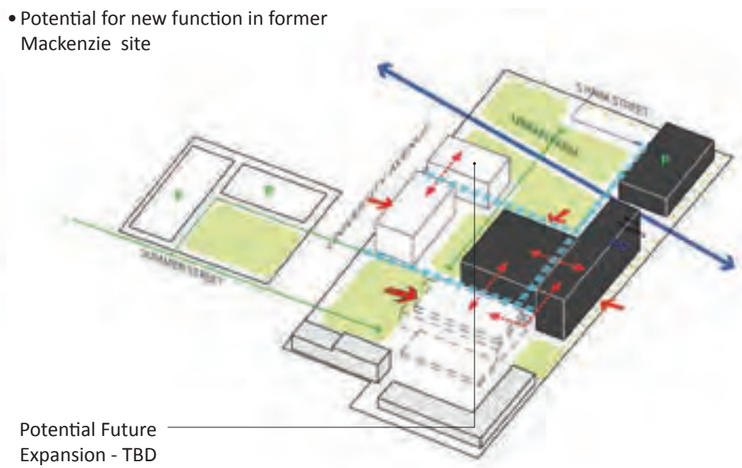
- Potential for new function in former Bethune site



Potential Future
Expansion - TBD

Phase 4 - 2045

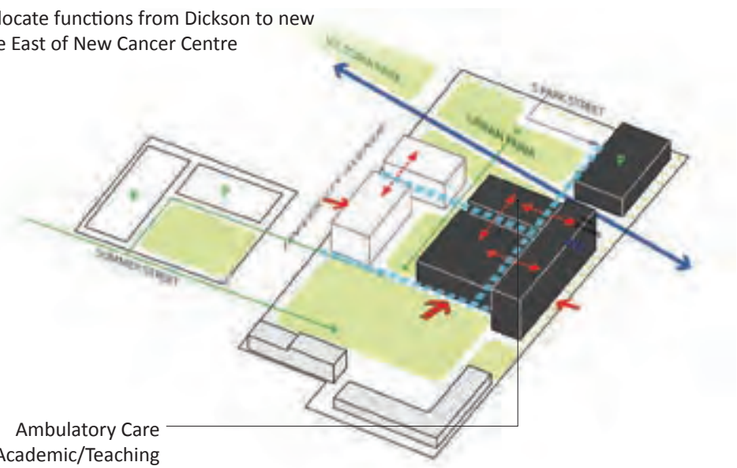
- Potential for new function in former Mackenzie site



Potential Future
Expansion - TBD

Phase 4 - 2045

- Relocate functions from Dickson to new site East of New Cancer Centre



Ambulatory Care
Academic/Teaching
Clinical Support
Diagnostic Imaging

Fig. 510 Victoria General Site Exploration B

5.3 Victoria General (VG) Site

5.3.4. Victoria General Site Phasing Implications

Victoria General Site - Phase 1

1. Decant Centennial & Victoria
2. Critical Services to be Relocated
   e.g. Shipping & Receiving, Food Services etc.
3. Decommission
4. Demolish
5. Tunnel System Retained

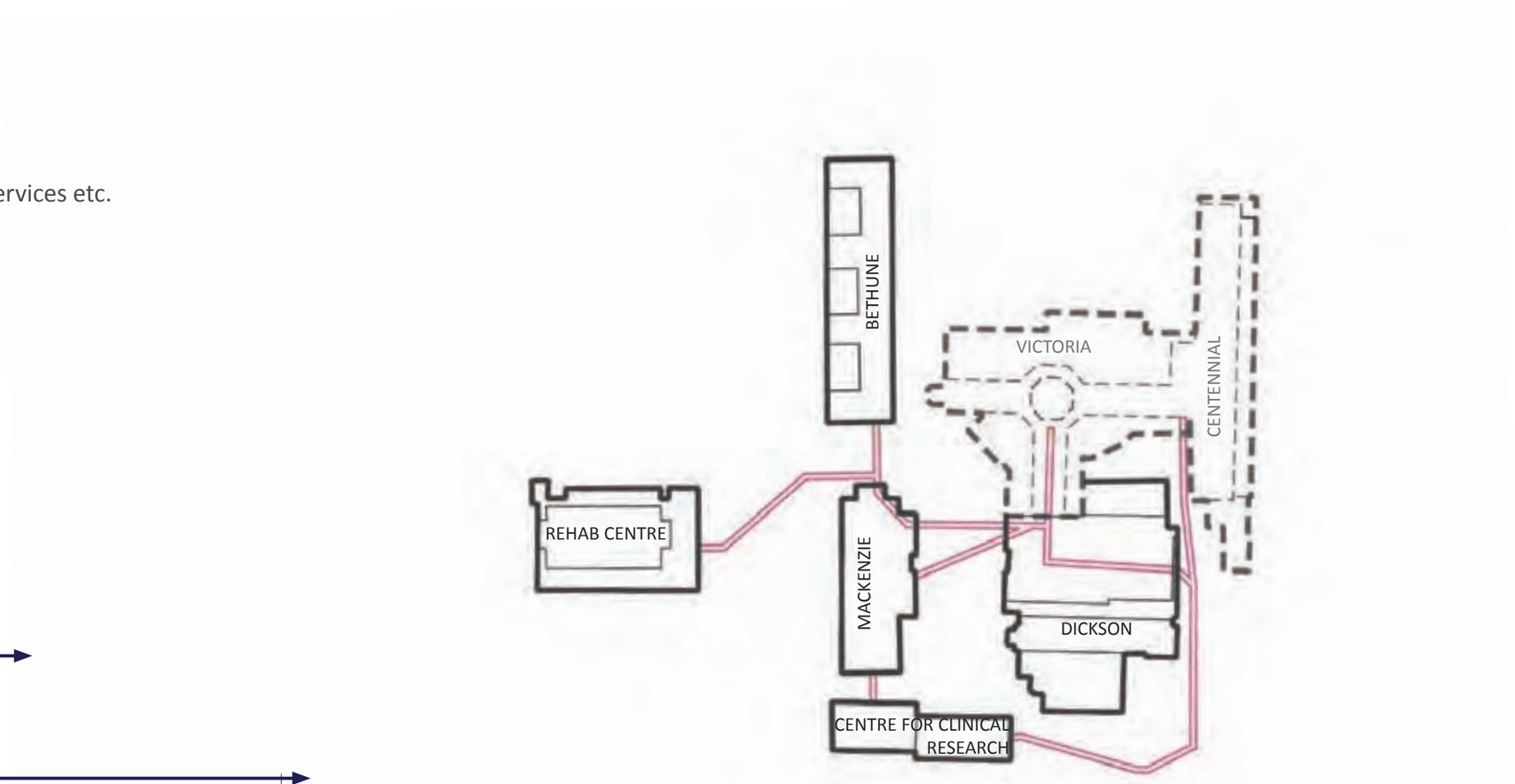


Fig. 511 Victoria General Scheduling Implications

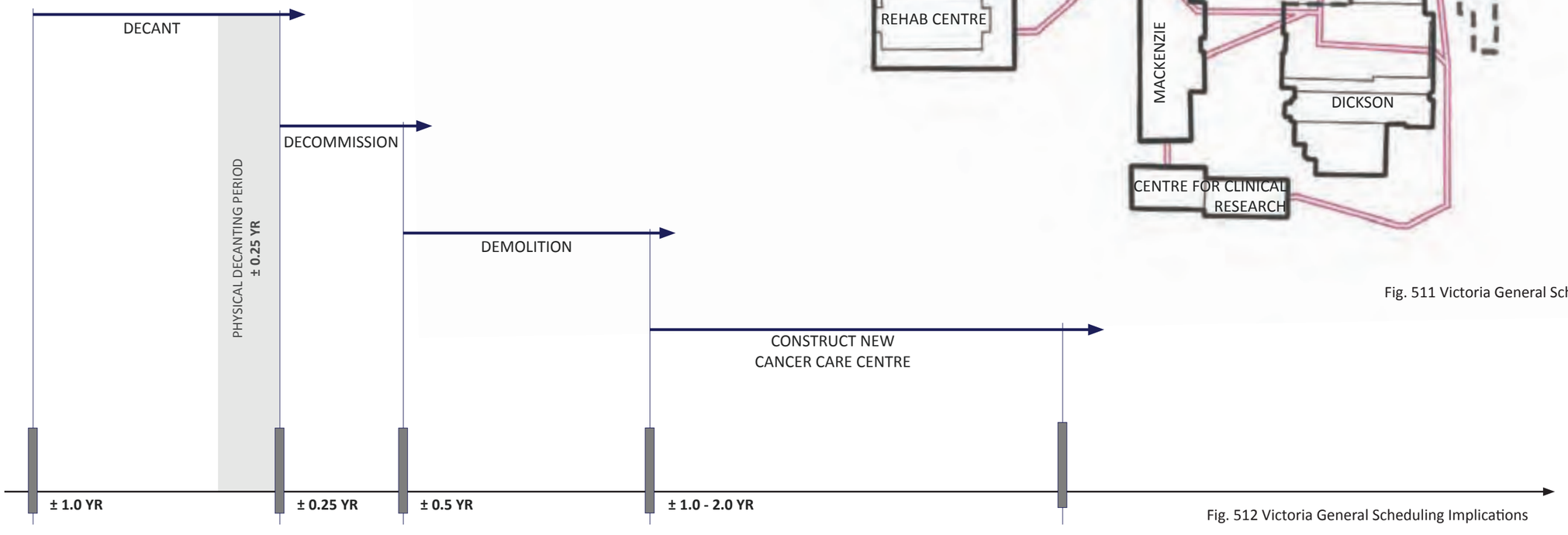


Fig. 512 Victoria General Scheduling Implications

6

Test Fit Explorations

6.1 Test Fit Explorations

6.1.1. Introduction

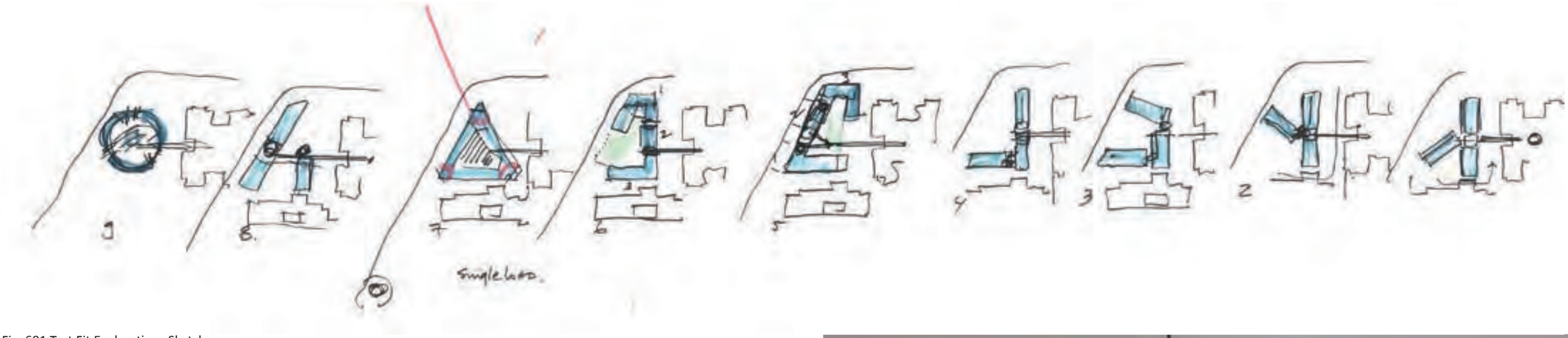


Fig. 601 Test Fit Explorations Sketches

TO BE UPDATED

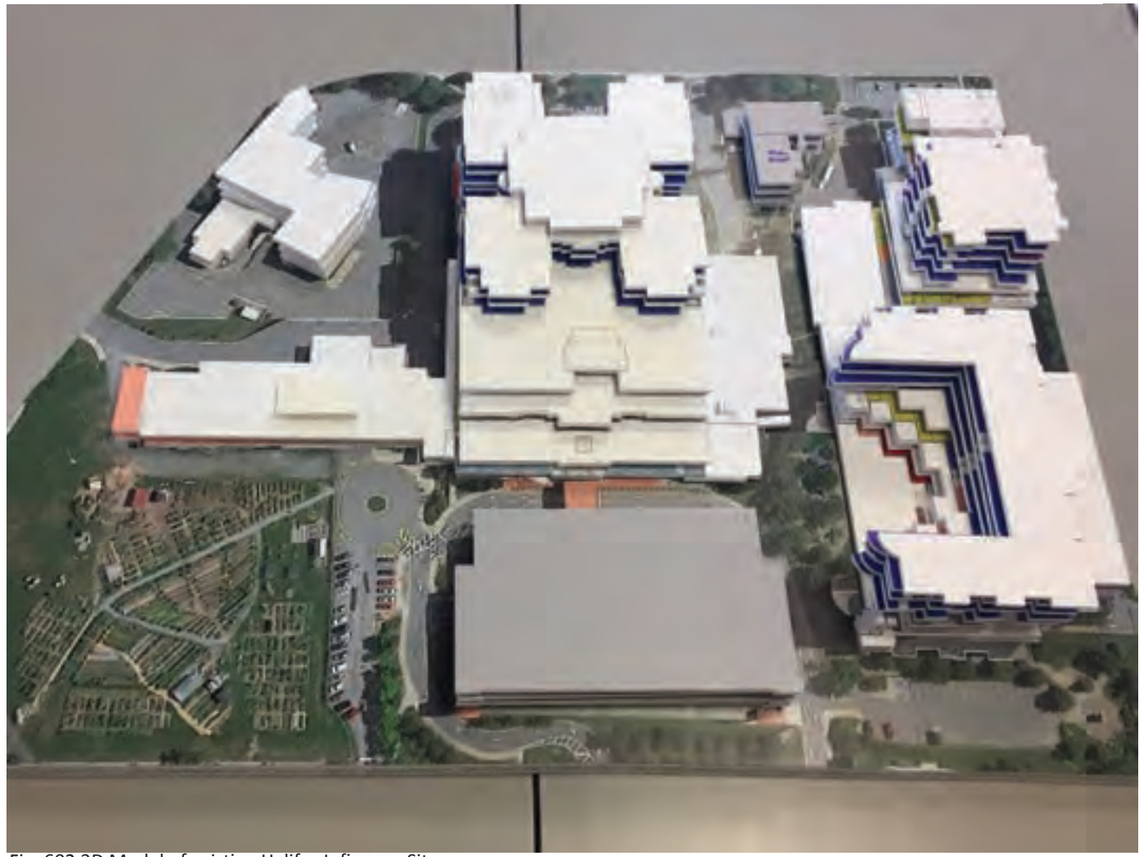


Fig. 602 3D Model of existing Halifax Infirmary Site

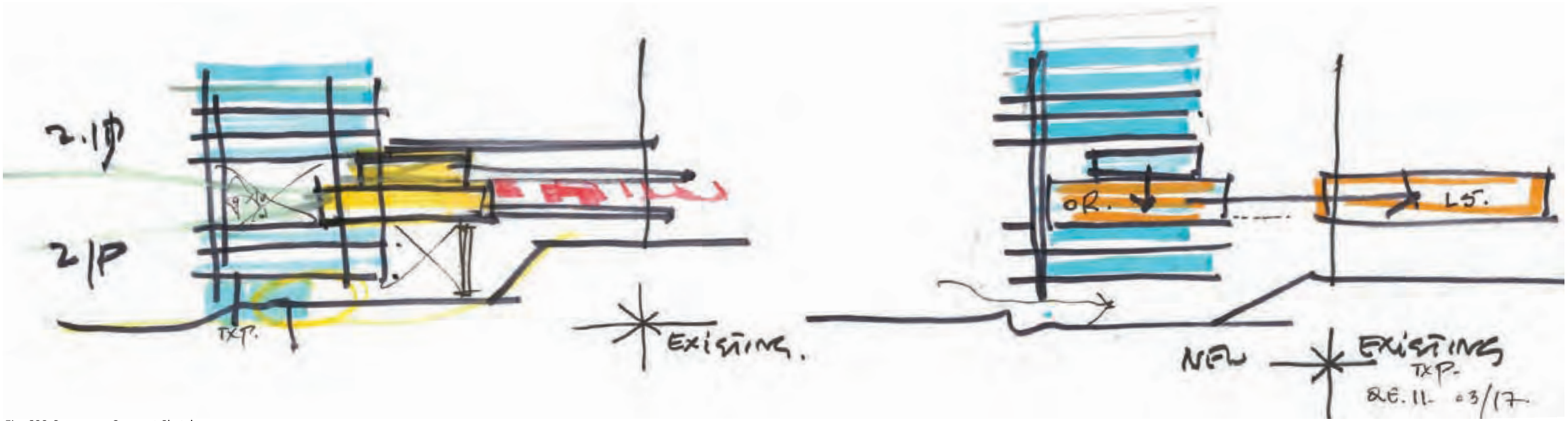


Fig. 603 Commons Concept Sketch

A

Commons Concept

6.2 Test Fit Exploration A - Commons Concept

6.2.1. Site Plan

• New OR and IP building constructed on CBC site
• New freestanding Ambulatory building linked to existing parking structure

1. Immediate demo of CBC
2. Clarity in way finding
3. Lateral connectivity between new and existing provided
4. Oppportunities to capitalize on views for Ambulatory building and the Inpatient units
5. During construction the access and operation of existing Emergency is not impacted
6. Existing site circulation patterns are retained
7. Current HI drop-off maintained during construction
8. Connection with new/existing Operating Rooms on Level 05
9. Connection with new/existing Inpatient on Level 06 provided
10. Two levels of below-grade parking to bedrock following removal of contaminated soil for the Ambulatory Care building
11. Creating an identifiable landmark Ambulatory Care building
12. Clear identity of Ambulatory Care building with views to adjacent green space
13. Existing circulation maintained, especially around the Emergency
14. Capitalize on grade change on CBC site
15. Urban farm relocated to Victoria General site

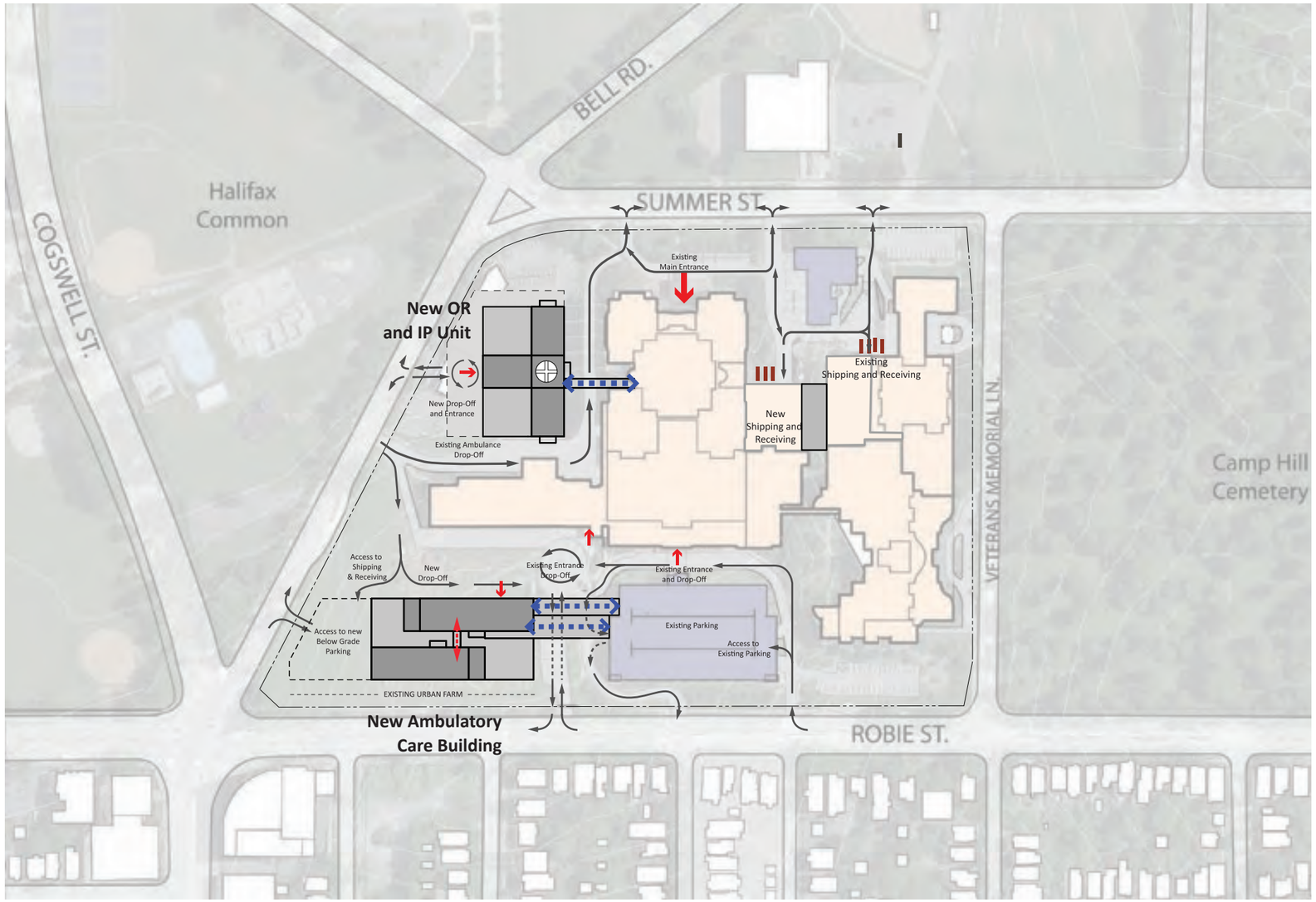
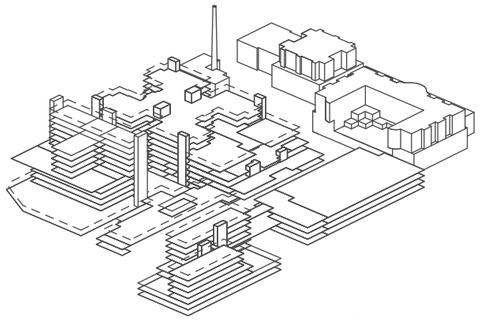


Fig. 604 Test Fit Exploration A Site Plan

6.2 Test Fit Exploration A - Commons Concept

6.2.2. Overall

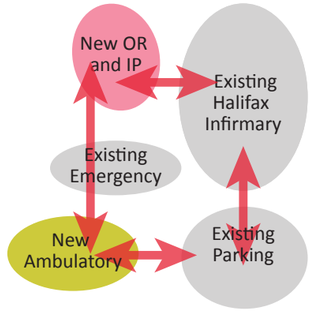


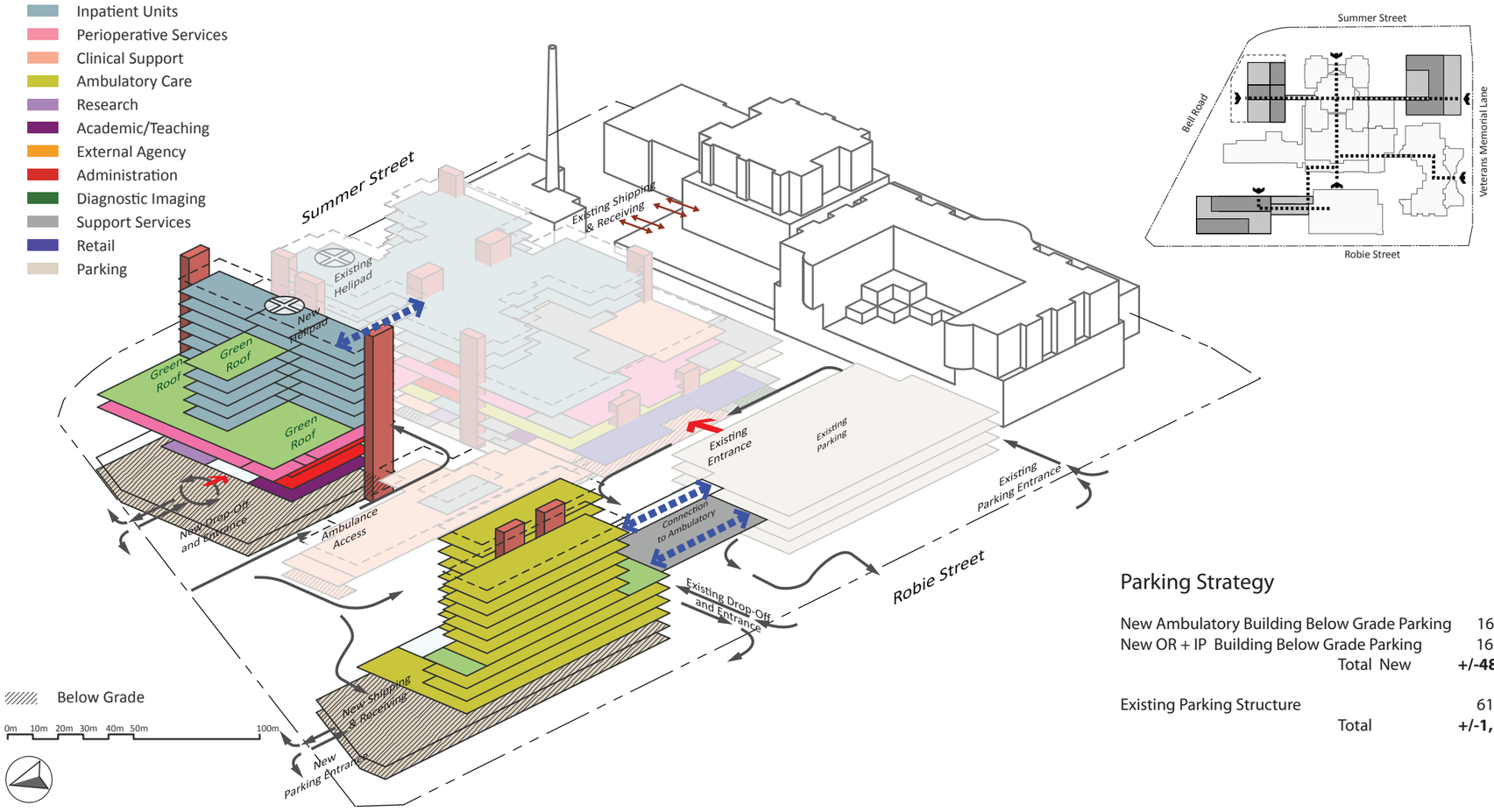
Test Fit A - New Program Summary		
	Area	
Use	M^2	SF
In Patient	9,800	**105,486**
Perioperative	4,250	**45,747**
Clinical Support	350	**3,767**
Ambulatory Care	17,300	**186,215**
Research	650	**6,997**
Academic/Teaching	650	**6,997**
External Agency		**0**
Administration	4,000	**43,056**
Diognostic Imaging	800	**8,611**
Support Service	3,400	**36,597**
Retail		**0**
New Parking Spaces	+/- 480	

Notes:

New Ambulatory Care Building Program

- Diagnostic Imaging
- Medical Day Care Unit
- Nutrition / Food
- IT
- Public Areas
- Security
- Medical Offices
- Ambulatory Procedure Unit
- Dialysis
- Heart Health
- Clinics
- Eye Centre
- Hyperbaric
- Support Services





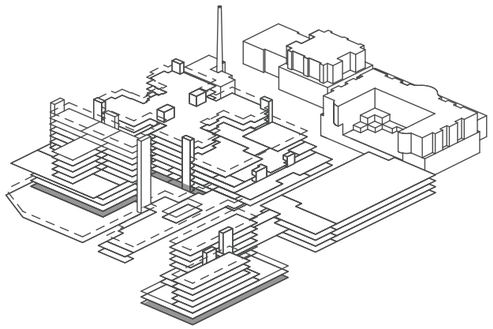
Parking Strategy

New Ambulatory Building Below Grade Parking	160
New OR + IP Building Below Grade Parking	160
Total New	**+/-480**
Existing Parking Structure	616
Total	**+/-1,100**

Fig. 605 Test Fit Exploration A Overall

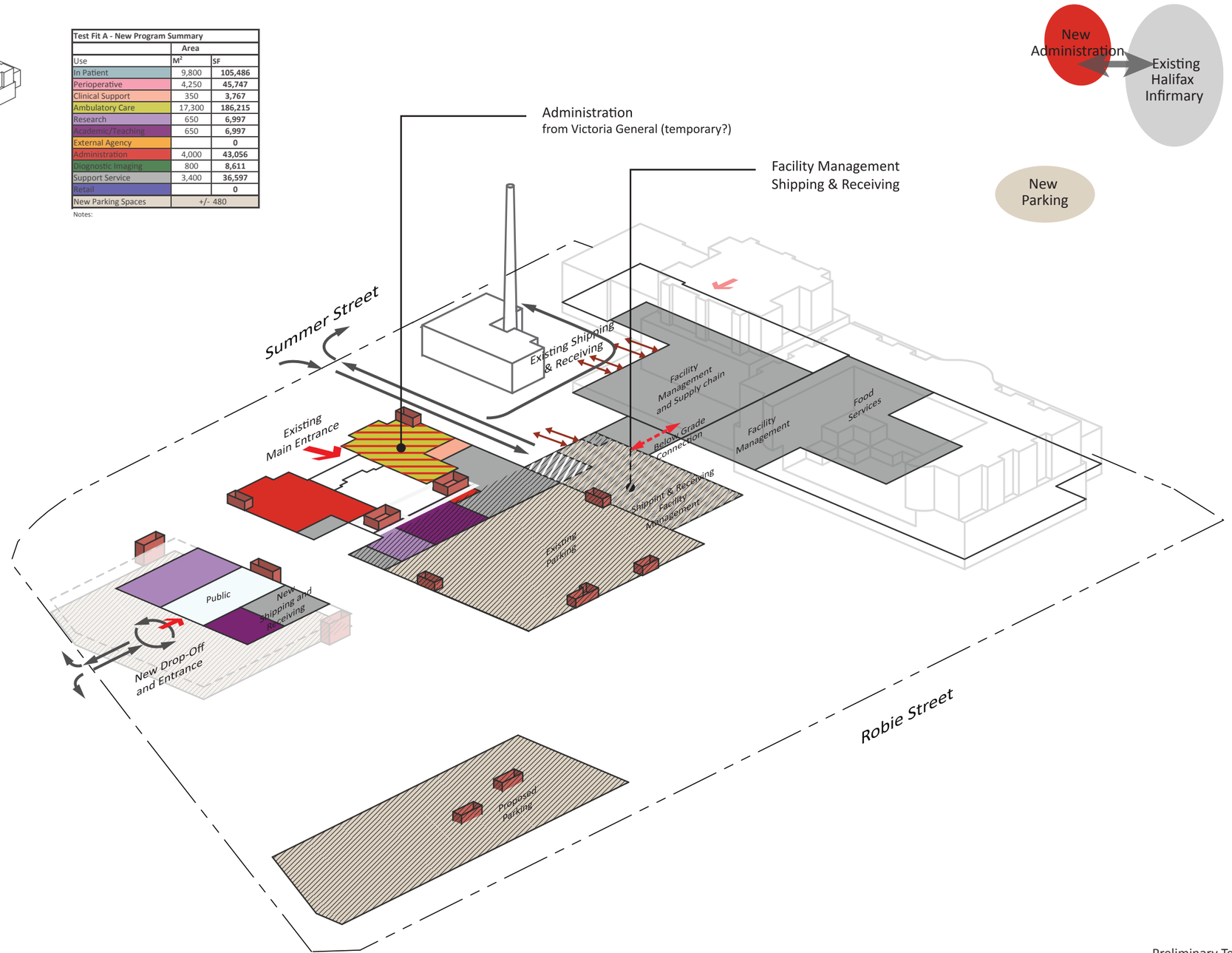
6.2 Test Fit Exploration A - Commons Concept

6.2.3. Level 01



Test Fit A - New Program Summary		
	Area	
Use	M^2	SF
In Patient	9,800	**105,486**
Perioperative	4,250	**45,747**
Clinical Support	350	**3,767**
Ambulatory Care	17,300	**186,215**
Research	650	**6,997**
Academic/Teaching	650	**6,997**
External Agency		**0**
Administration	4,000	**43,056**
Diagnostic Imaging	800	**8,611**
Support Service	3,400	**36,597**
Retail		**0**
New Parking Spaces	+/- 480	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Below Grade

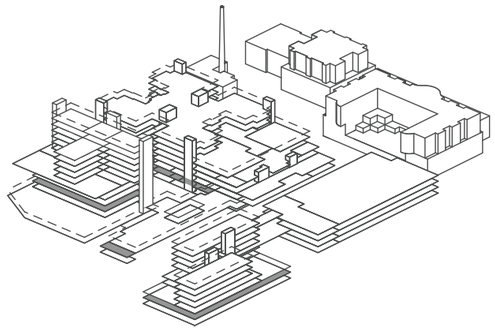
0m 10m 20m 30m 40m 50m 100m

Fig. 606 Test Fit Exploration A Level 01

Preliminary Test Fit - 2017.06.06

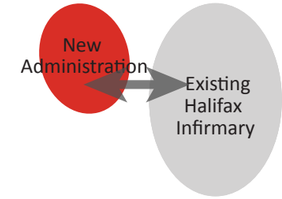
6.2 Test Fit Exploration A - Commons Concept

6.2.4. Level 02



Test Fit A - New Program Summary		
	Area	
Use	M^2	SF
In Patient	9,800	**105,486**
Perioperative	4,250	**45,747**
Clinical Support	350	**3,767**
Ambulatory Care	17,300	**186,215**
Research	650	**6,997**
Academic/Teaching	650	**6,997**
External Agency		**0**
Administration	4,000	**43,056**
Diagnostic Imaging	800	**8,611**
Support Service	3,400	**36,597**
Retail		**0**
New Parking Spaces	+/- 480	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

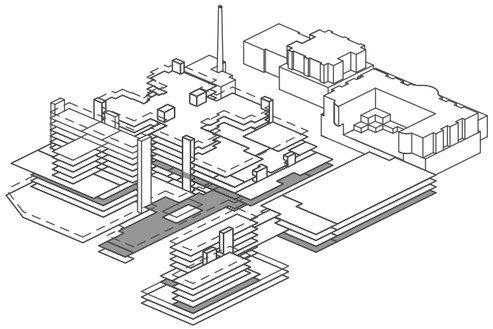
Below Grade

0m 10m 20m 30m 40m 50m 100m

Fig. 607 Test Fit Exploration A Level 02

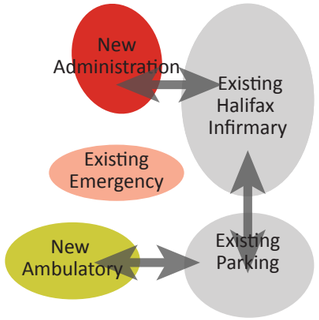
6.2 Test Fit Exploration A - Commons Concept

6.2.5. Level 03



Test Fit A - New Program Summary		
	Area	
Use	M^2	SF
In Patient	9,800	**105,486**
Perioperative	4,250	**45,747**
Clinical Support	350	**3,767**
Ambulatory Care	17,300	**186,215**
Research	650	**6,997**
Academic/Teaching	650	**6,997**
External Agency		**0**
Administration	4,000	**43,056**
Diagnostic Imaging	800	**8,611**
Support Service	3,400	**36,597**
Retail		**0**
New Parking Spaces	+/- 480	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Below Grade

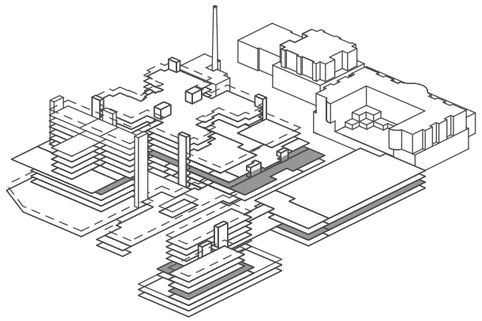
0m 10m 20m 30m 40m 50m 100m

Fig. 608 Test Fit Exploration A Level 03

Preliminary Test Fit - 2017.06.06

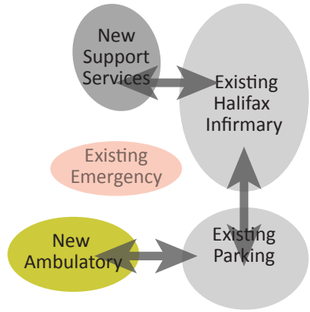
6.2 Test Fit Exploration A - Commons Concept

6.2.6. Level 04

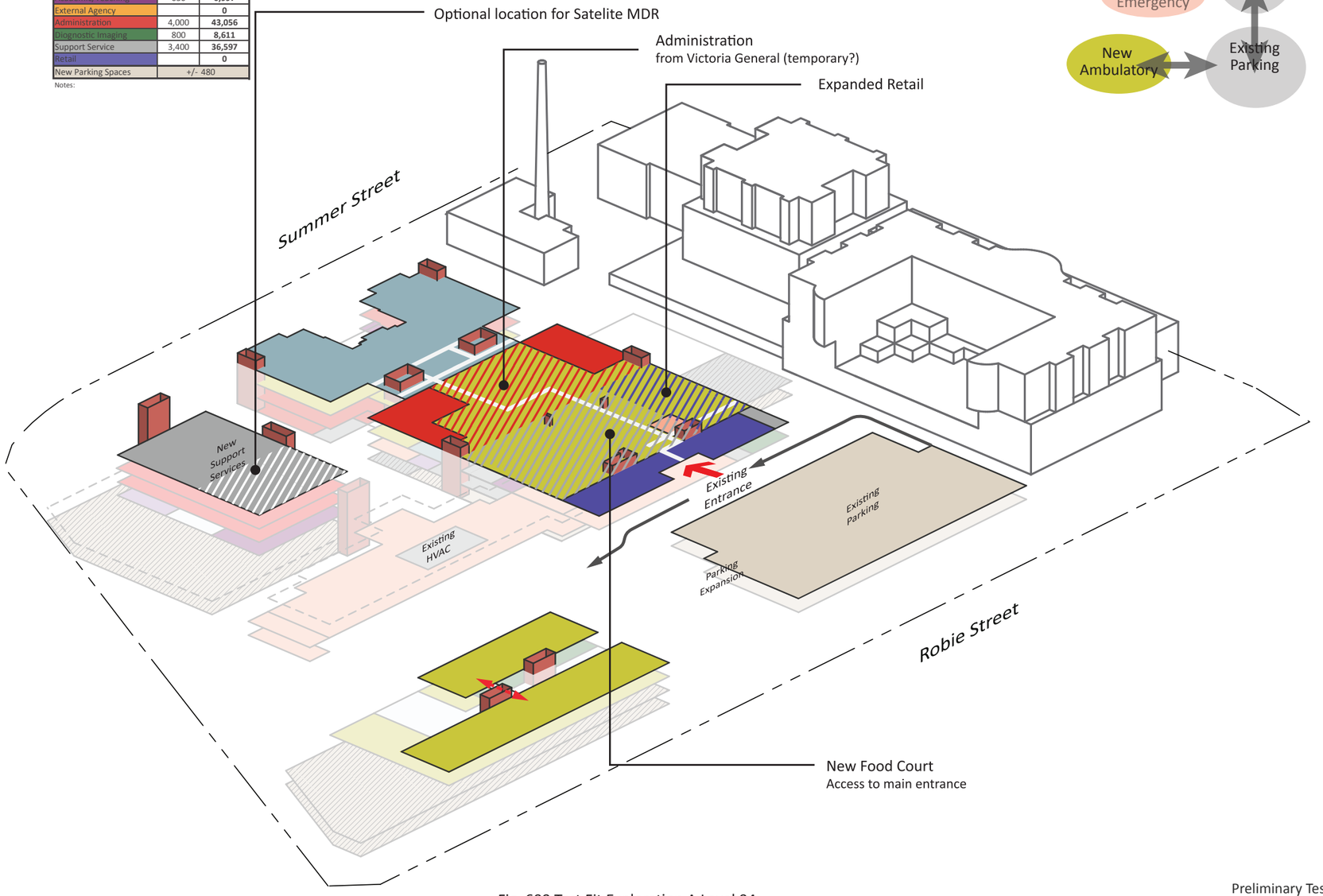


Test Fit A - New Program Summary		
	Area	
Use	M^2	SF
In Patient	9,800	**105,486**
Perioperative	4,250	**45,747**
Clinical Support	350	**3,767**
Ambulatory Care	17,300	**186,215**
Research	650	**6,997**
Academic/Teaching	650	**6,997**
External Agency		**0**
Administration	4,000	**43,056**
Diognostic Imaging	800	**8,611**
Support Service	3,400	**36,597**
Retail		**0**
New Parking Spaces	+/- 480	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Below Grade

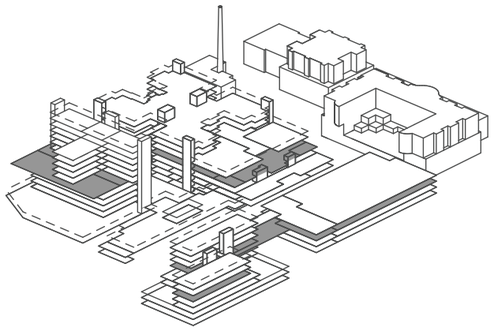
0m 10m 20m 30m 40m 50m 100m

Fig. 609 Test Fit Exploration A Level 04

Preliminary Test Fit - 2017.06.06

6.2 Test Fit Exploration A - Commons Concept

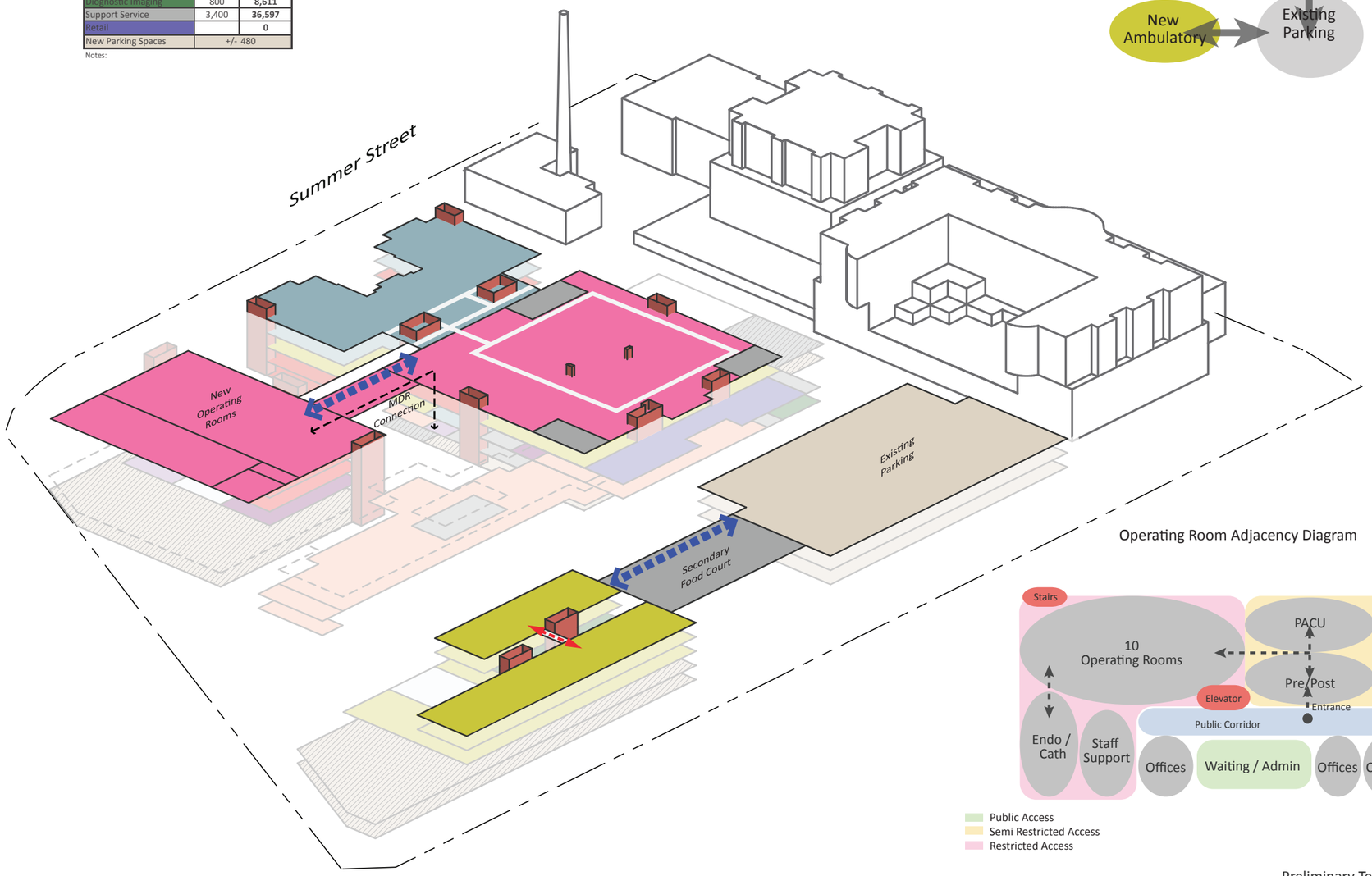
6.2.7. Perioperative Level 05



Test Fit A - New Program Summary		
	Area	
Use	M^2	SF
In Patient	9,800	**105,486**
Perioperative	4,250	**45,747**
Clinical Support	350	**3,767**
Ambulatory Care	17,300	**186,215**
Research	650	**6,997**
Academic/Teaching	650	**6,997**
External Agency		**0**
Administration	4,000	**43,056**
Diognostic Imaging	800	**8,611**
Support Service	3,400	**36,597**
Retail		**0**
New Parking Spaces	+/- 480	

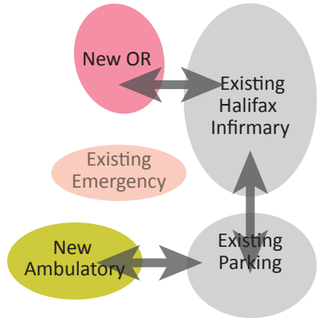
Notes:

- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Below Grade

0m 10m 20m 30m 40m 50m 100m



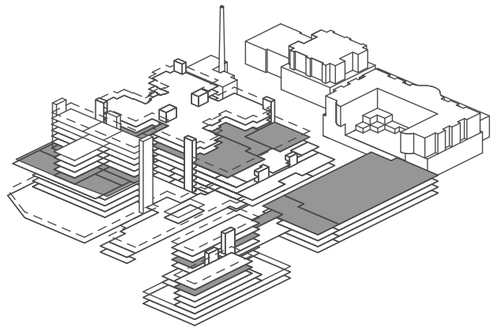
Operating Room Adjacency Diagram

Preliminary Test Fit - 2017.06.06

Fig. 610 Test Fit Exploration A Perioperative Level 05

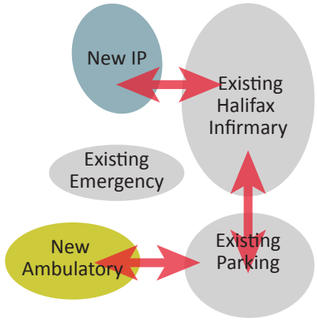
6.2 Test Fit Exploration A - Commons Concept

6.2.8. Inpatient Level 06



Test Fit A - New Program Summary		
	Area	
Use	M^2	SF
In Patient	9,800	**105,486**
Perioperative	4,250	**45,747**
Clinical Support	350	**3,767**
Ambulatory Care	17,300	**186,215**
Research	650	**6,997**
Academic/Teaching	650	**6,997**
External Agency		**0**
Administration	4,000	**43,056**
Diagnostic Imaging	800	**8,611**
Support Service	3,400	**36,597**
Retail		**0**
New Parking Spaces	+/- 480	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Below Grade

0m 10m 20m 30m 40m 50m 100m

Fig. 611 Test Fit Exploration A Inpatient Level 06

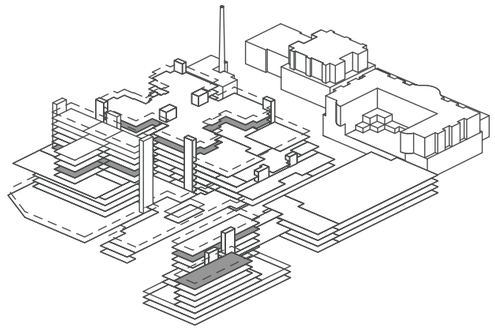
Inpatient Adjacency Diagram

Preliminary Test Fit - 2017.06.06

kasian

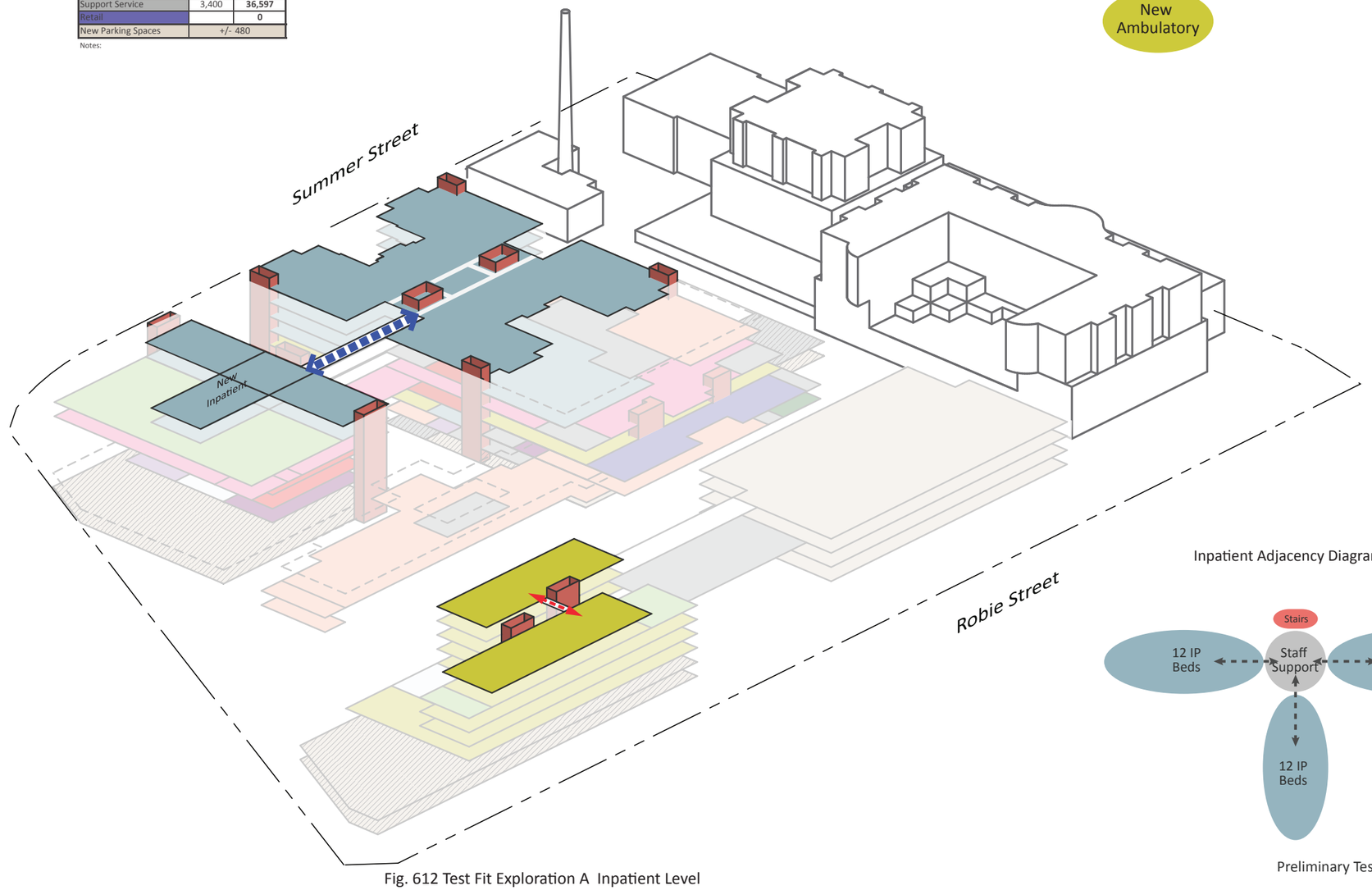
6.2 Test Fit Exploration A - Commons Concept

6.2.9. Inpatient Level (Typical)



Test Fit A - New Program Summary		
	Area	
Use	M^2	SF
In Patient	9,800	**105,486**
Perioperative	4,250	**45,747**
Clinical Support	350	**3,767**
Ambulatory Care	17,300	**186,215**
Research	650	**6,997**
Academic/Teaching	650	**6,997**
External Agency		**0**
Administration	4,000	**43,056**
Diognostic Imaging	800	**8,611**
Support Service	3,400	**36,597**
Retail		**0**
New Parking Spaces	+/- 480	

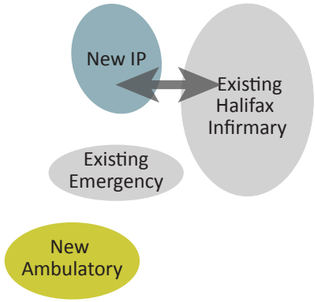
Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Below Grade

0m 10m 20m 30m 40m 50m 100m



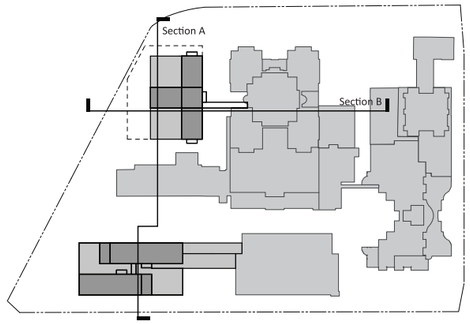
Inpatient Adjacency Diagram - Typical Units

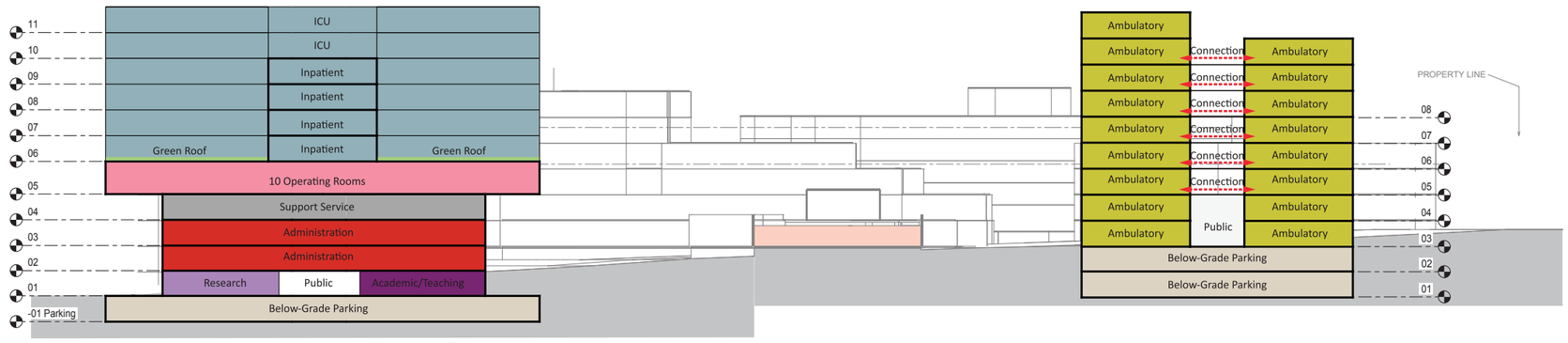
Preliminary Test Fit - 2017.06.06

Fig. 612 Test Fit Exploration A Inpatient Level

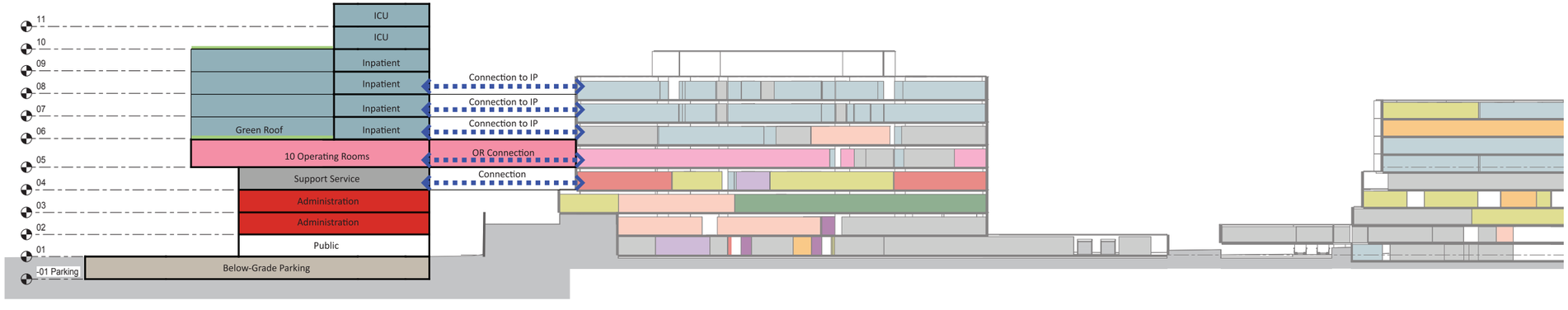
6.2 Test Fit Exploration A - Commons Concept

6.2.10. Sections





Section A - Scale 1 : 500



Section B - Scale 1 : 500

Fig. 613 Test Fit Exploration A Sections

6.2 Test Fit Exploration A - Commons Concept

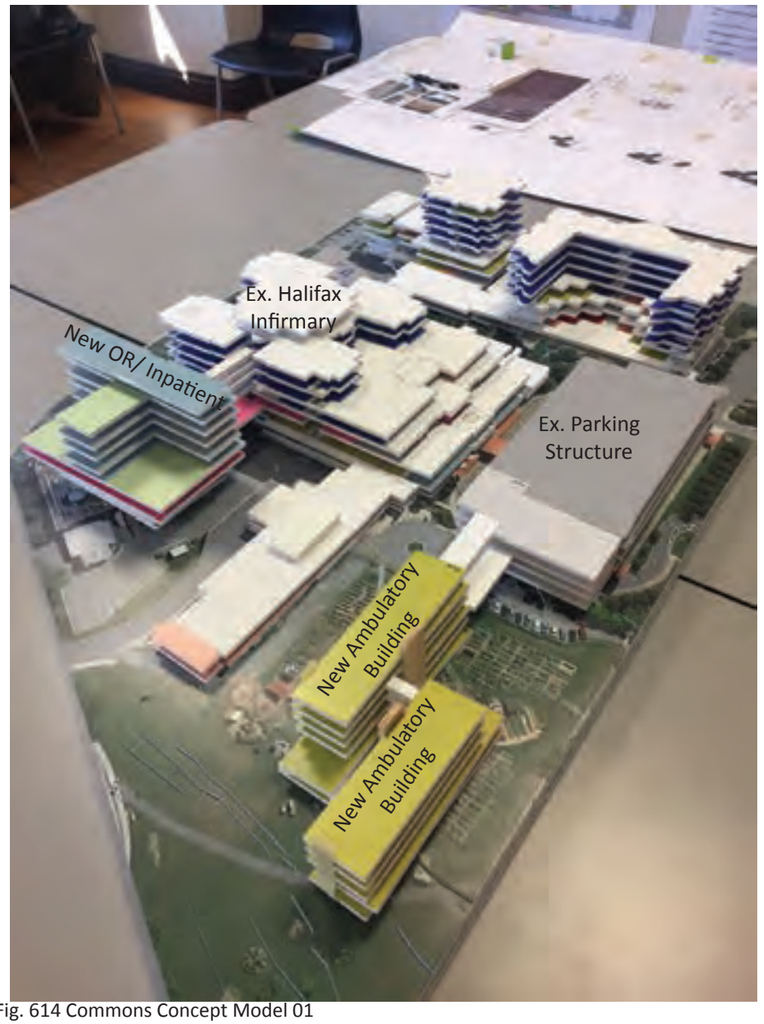


Fig. 614 Commons Concept Model 01

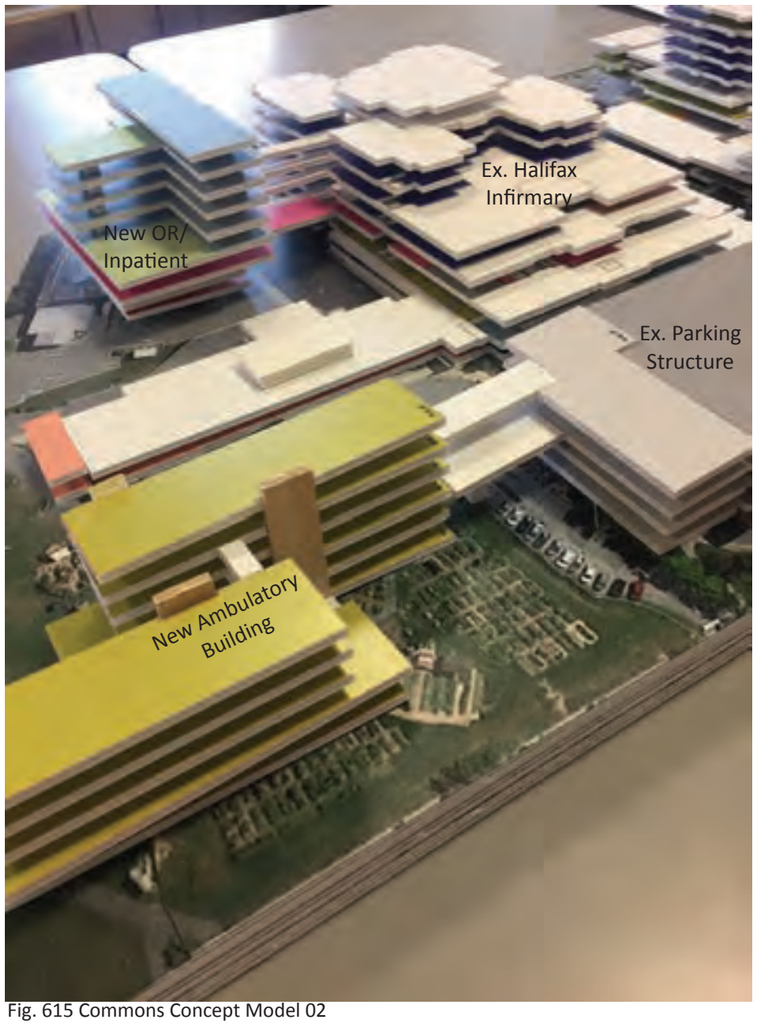


Fig. 615 Commons Concept Model 02

6.2 Test Fit Exploration A - Commons Concept

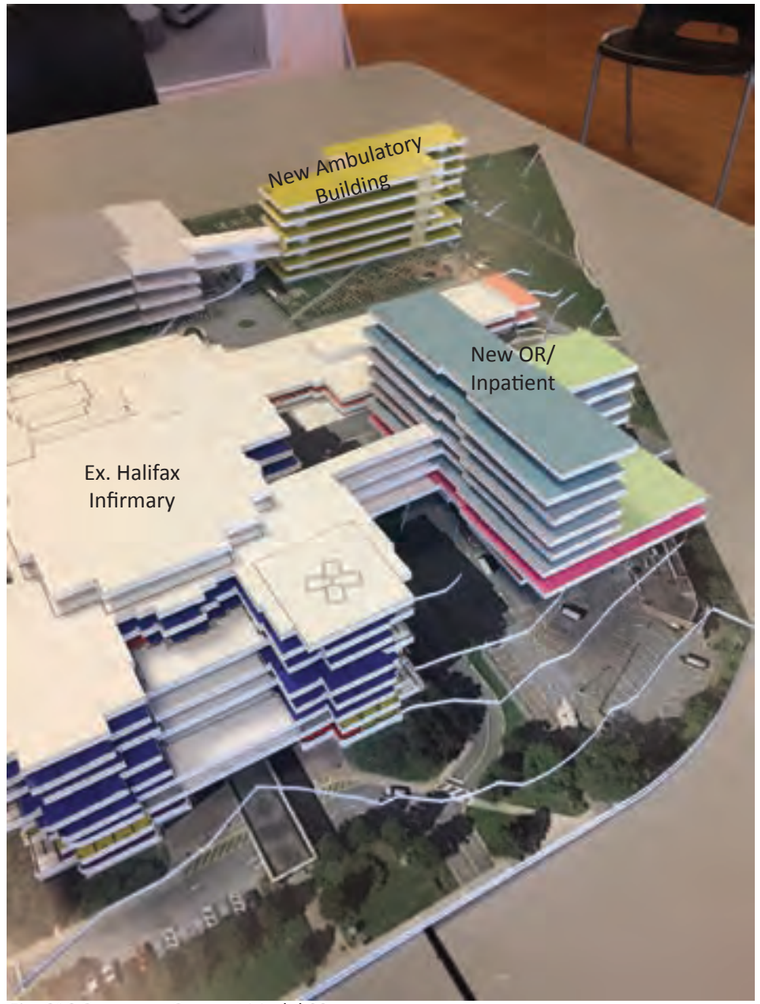


Fig. 616 Commons Concept Model 03

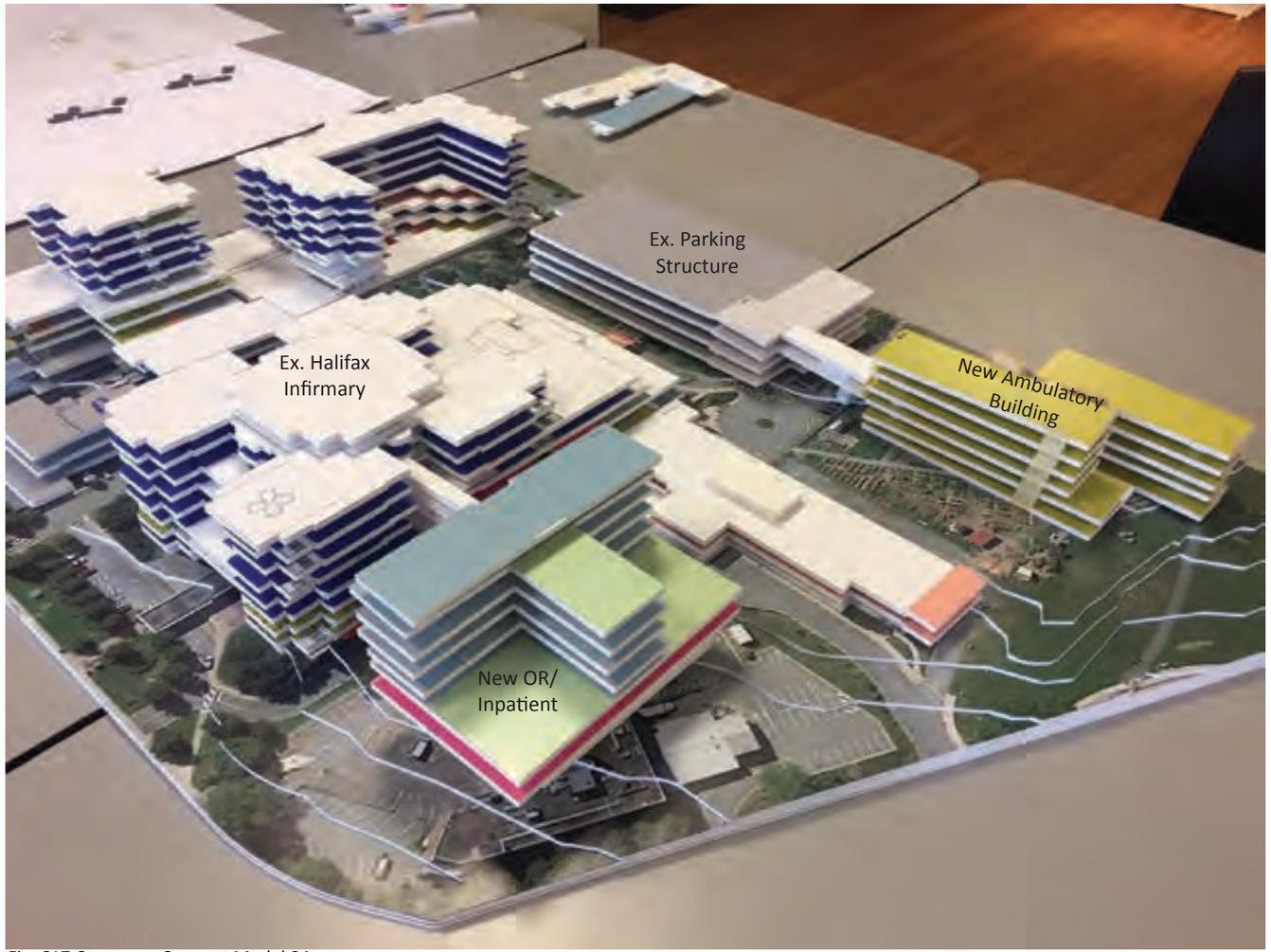


Fig. 617 Commons Concept Model 04

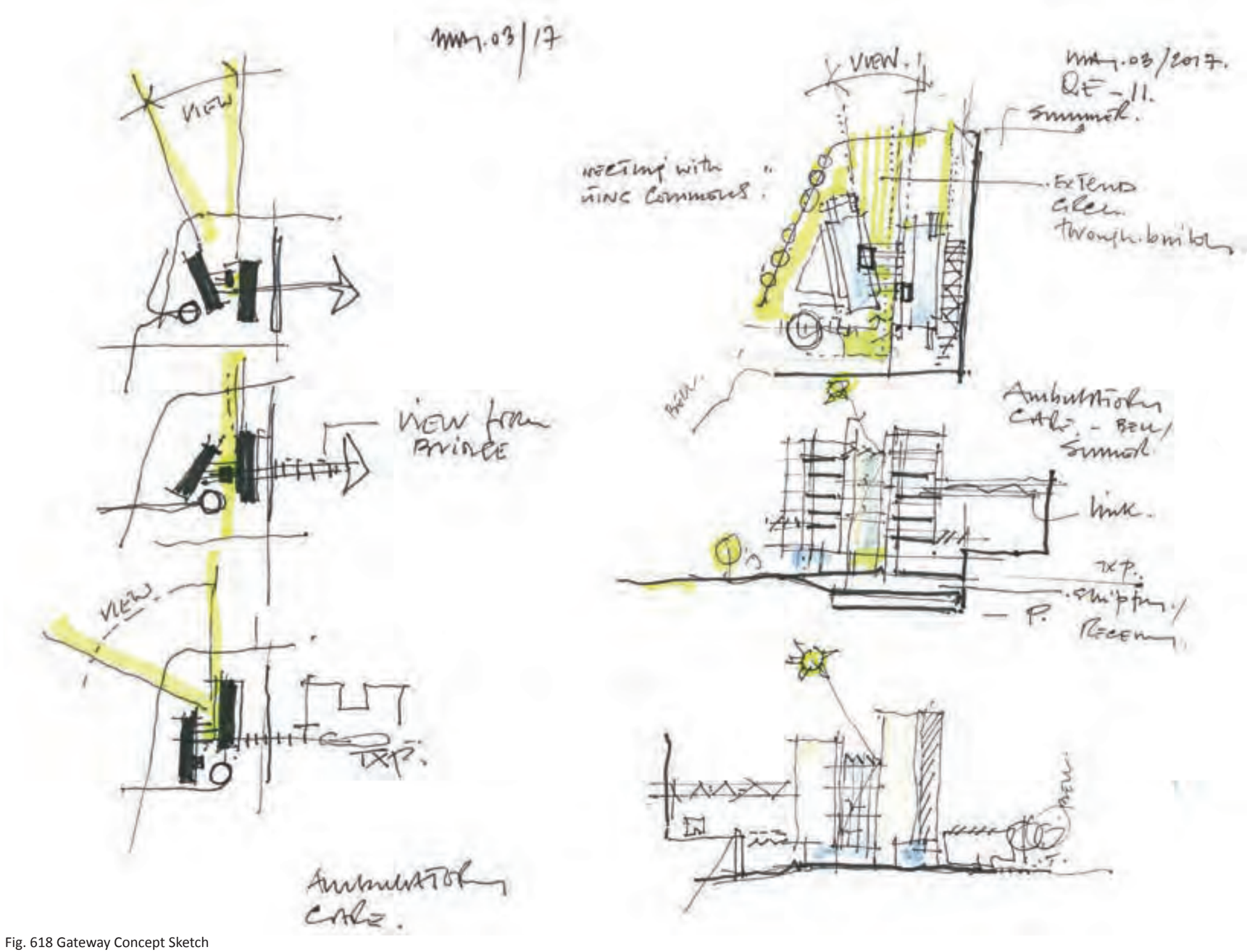


Fig. 618 Gateway Concept Sketch

B

Gateway Concept

6.3 Test Fit Exploration B - Gateway Concept

6.3.1. Site Plan

- **New OR and IP building constructed above existing Emergency building**
- **Expand parking structure**
- **New freestanding Ambulatory building linked to expanded existing parking structure**

1. CBC site retained for future expansion
2. Clarity in way-finding
3. Lateral connectivity between new and existing provided
4. Oppportunities to capitalize on views for Ambulatory building and Inpatient units to Halifax Commons
5. Disruption to existing Emergency building during construction
6. While existing site circulation patterns are retained, a new identifiable gateway along Robie St between the new Ambulatory building and the parking structrure is created
7. Current HI drop-off adjacent to parking structure remains
8. Connection with new/existing Operating Rooms on Level 05 provided
9. Connection with new/existing Inpatient on Level 06 provided
10. Two below-grade parking levels to bedrock following removal of contaminated soil at old school site
11. Creating an identifiable landmark Ambulatory Care building
12. Clear identity of Ambulatory Care building with views to surrounding green space as well as optimal solar exposure
12. Existing circulation maintained, especially around the Emergency
13. Urban farm relocated to Victoria General site

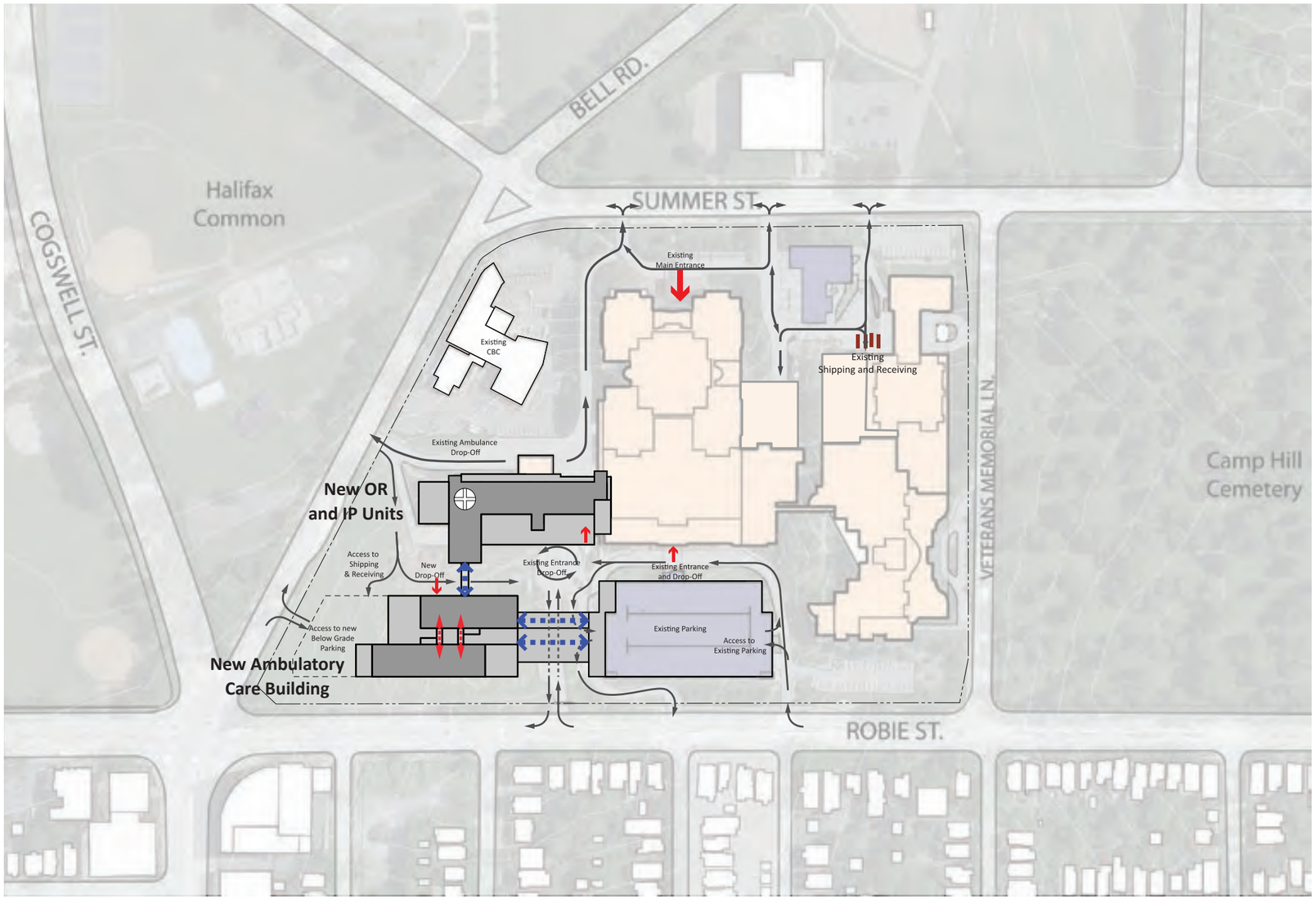
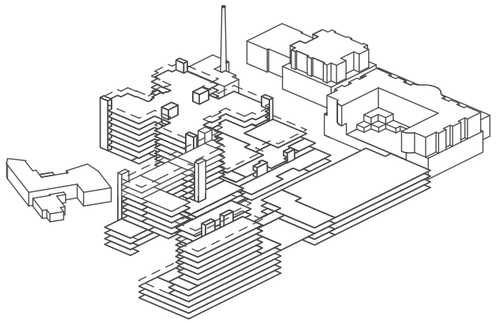


Fig. 619 Test Fit Exploration B Site Plan

6.3 Test Fit Exploration B - Gateway Concept

6.3.2. Overall

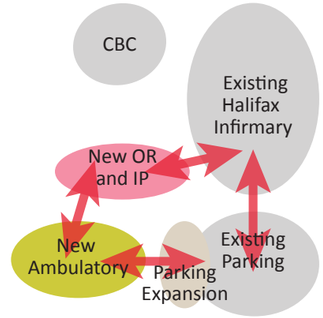


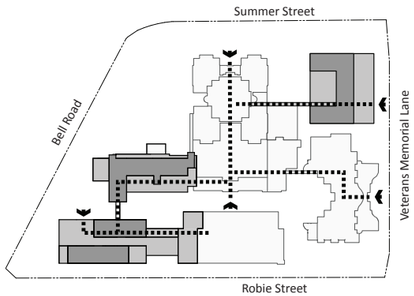
Test Fit B - New Program Summary		
	Area	
Use	M^2	SF
Inpatient	8,400	**90,417**
Perioperative	3,550	**38,212**
Clinical Support	350	**3,767**
Ambulatory Care	18,100	**194,827**
Research		**0**
Academic/Teaching		**0**
External Agency		**0**
Administration		**0**
Diagnostic Imaging		**0**
Support Service	3,050	**32,830**
Retail		**0**
New Parking Spaces	+/- 430	

Notes:

New Ambulatory Care Building Program

- dermatology
- MS
- endocrinology
- hyperbaric medicine
- ENT
- internal medicine
- general surgery
- gastroenterology
- heart health
  (from Halifax Infirmary Building)
- hypertension
- immunology
- infectious diseases
- opthalmology
- oral and maxillofacial
- pain
- preadmission
- transplant
- thoratic





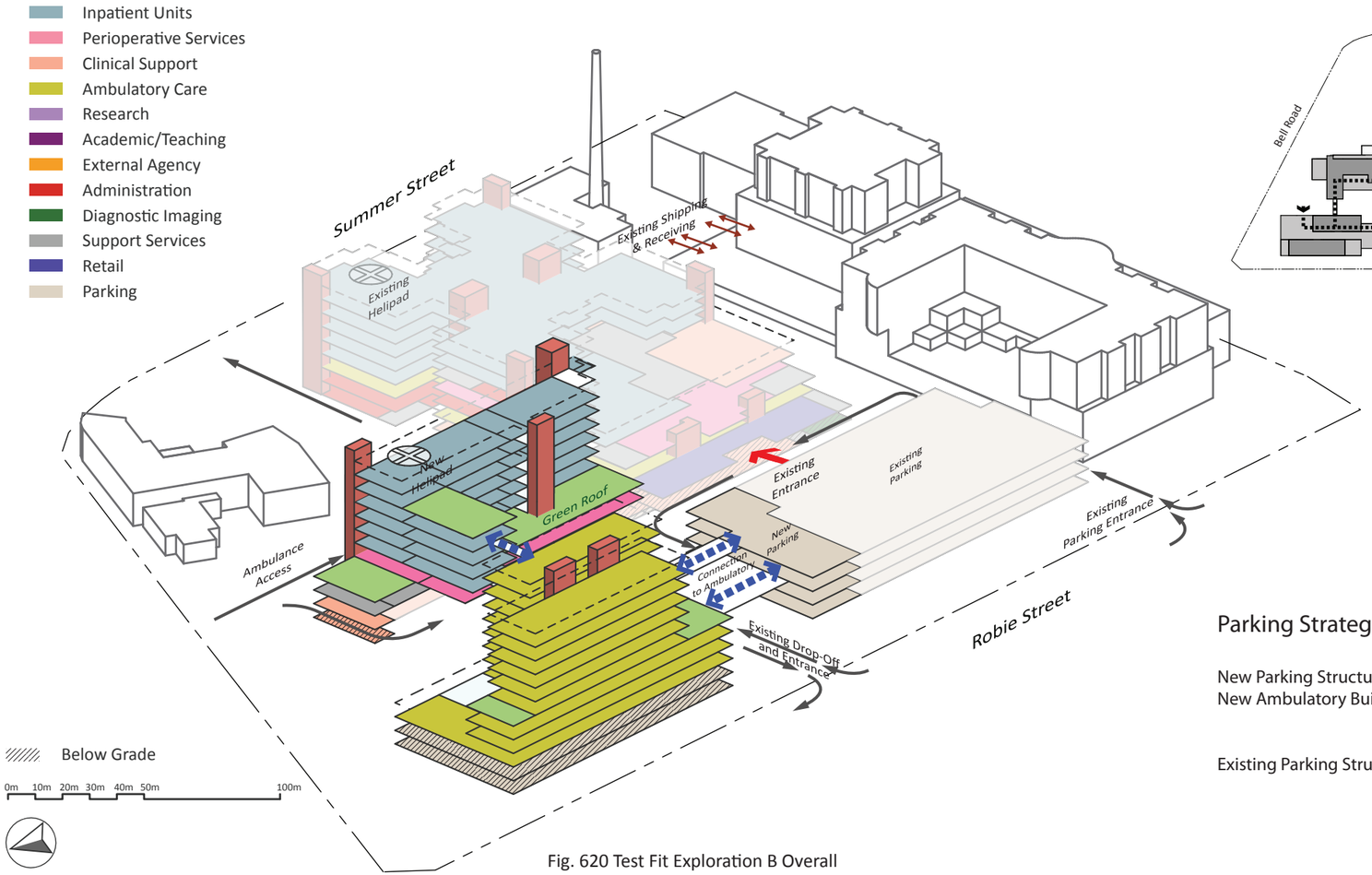


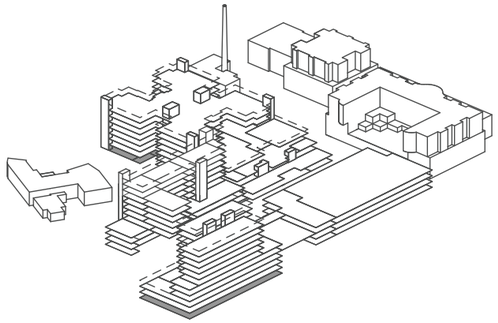
Fig. 620 Test Fit Exploration B Overall

Parking Strategy

New Parking Structure Expansion	180
New Ambulatory Building Below Grade Parking	250
Total New	**+/-430**
Existing Parking Structure	616
Total	**+/-1,050**

6.3 Test Fit Exploration B - Gateway Concept

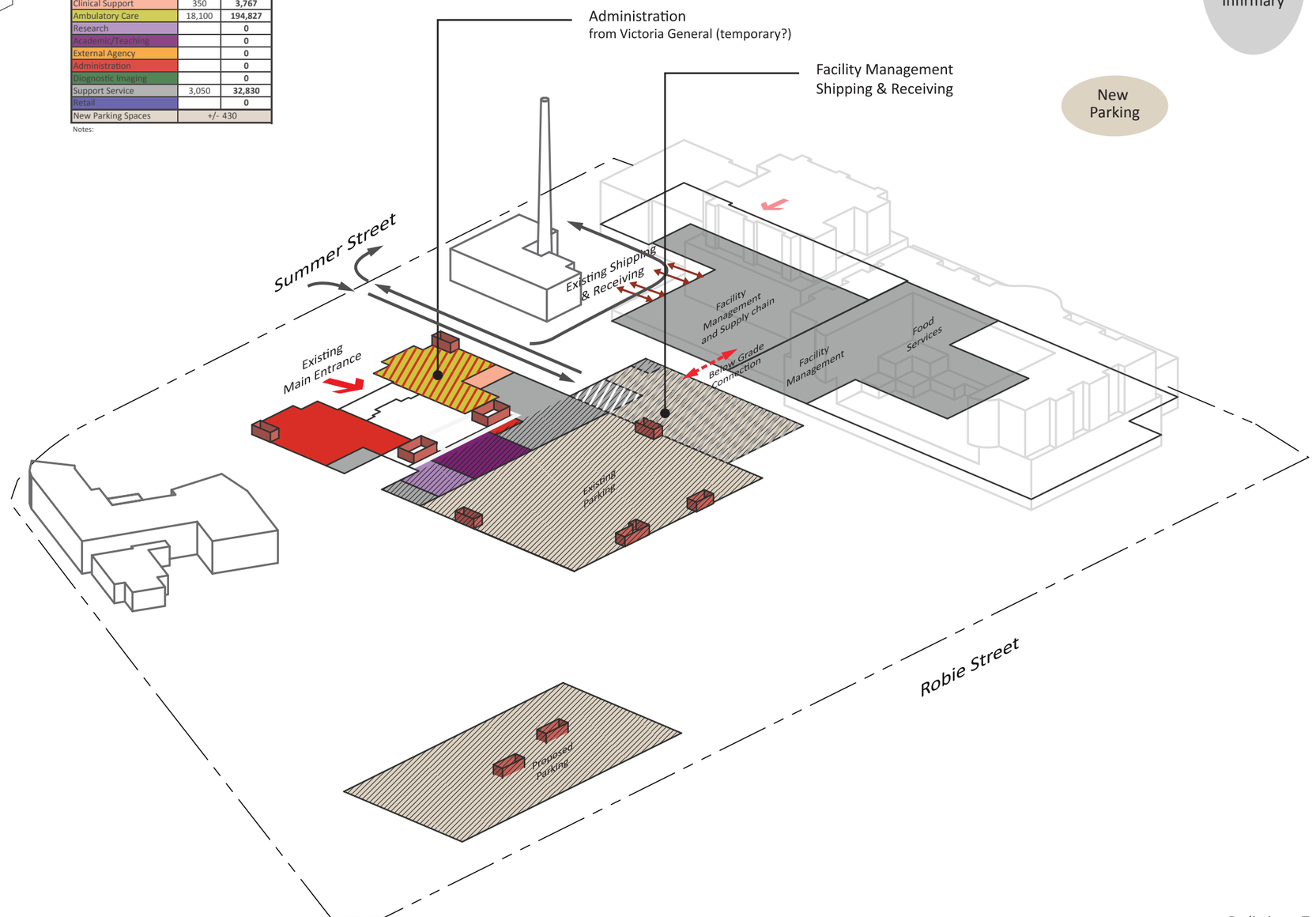
6.3.3. Level 01



Test Fit B - New Program Summary		
	Area	
Use	M^2	SF
Inpatient	10,600	**114,097**
Perioperative	3,550	**38,212**
Clinical Support	350	**3,767**
Ambulatory Care	18,100	**194,827**
Research		**0**
Academic/Teaching		**0**
External Agency		**0**
Administration		**0**
Diagnostic Imaging		**0**
Support Service	3,050	**32,830**
Retail		**0**
New Parking Spaces	+/- 430	

Notes:

- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



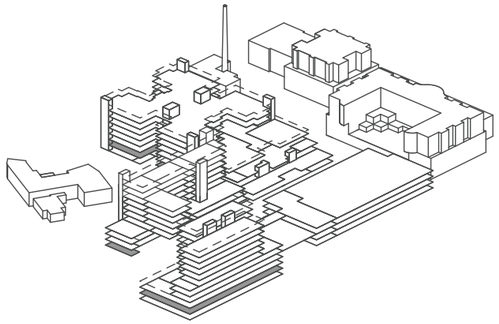
Below Grade

0m 10m 20m 30m 40m 50m 100m

Fig. 621 Test Fit Exploration B Level 01

6.3 Test Fit Exploration B - Gateway Concept

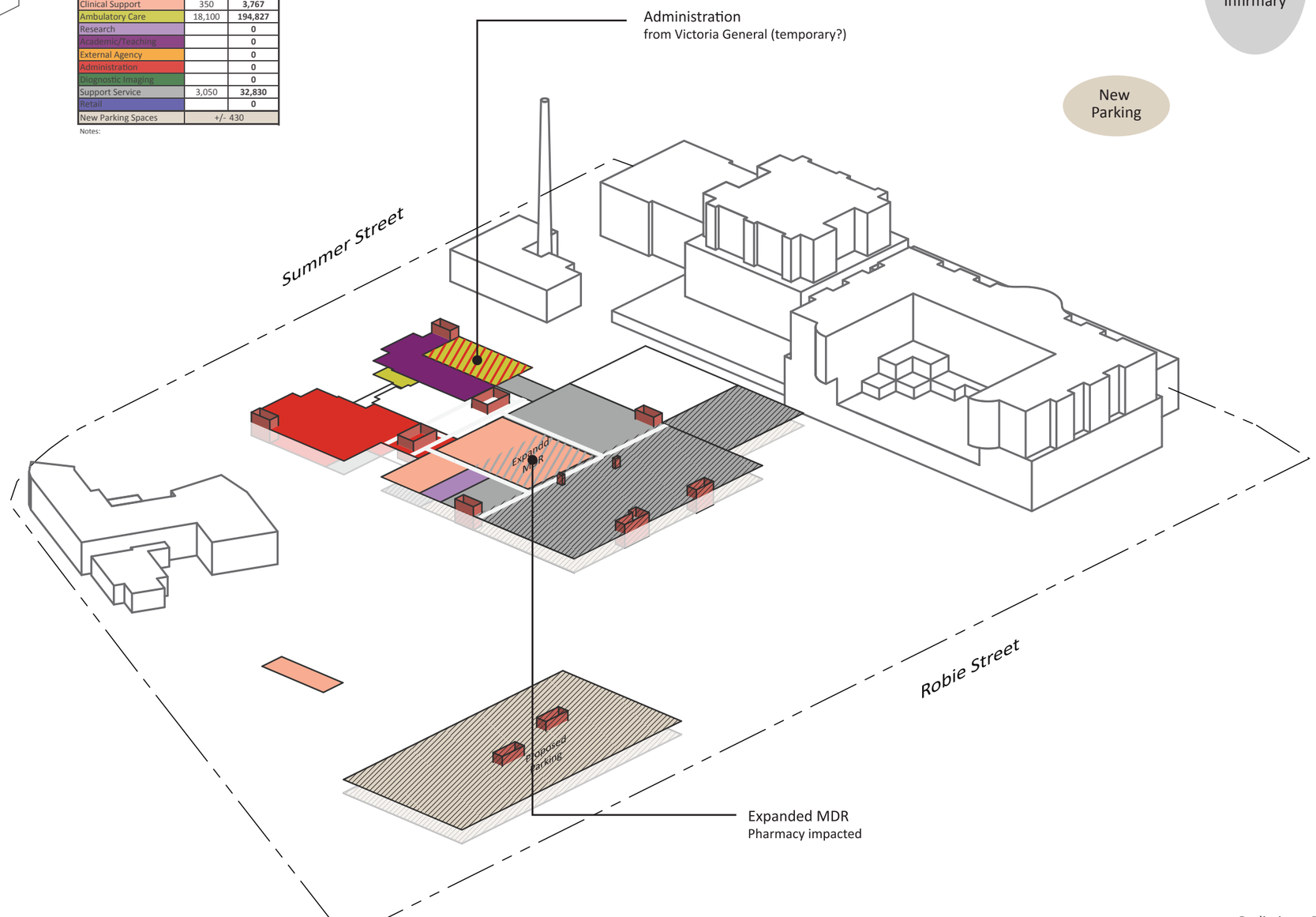
6.3.4. Level 02



Test Fit B - New Program Summary		
	Area	
Use	M^2	SF
Inpatient	10,600	**114,097**
Perioperative	3,550	**38,212**
Clinical Support	350	**3,767**
Ambulatory Care	18,100	**194,827**
Research		**0**
Academic/Teaching		**0**
External Agency		**0**
Administration		**0**
Diagnostic Imaging		**0**
Support Service	3,050	**32,830**
Retail		**0**
New Parking Spaces	+/- 430	

Notes:

- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Below Grade

0m 10m 20m 30m 40m 50m 100m

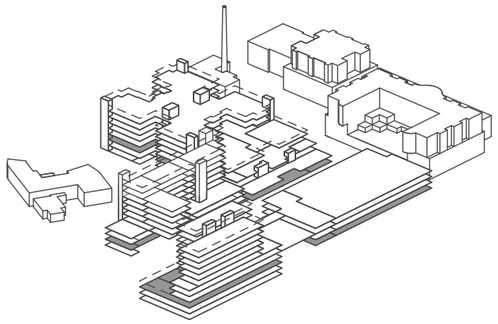
Fig. 622 Test Fit Exploration B Level 02

Preliminary Test Fit - 2017.06.06

kasian

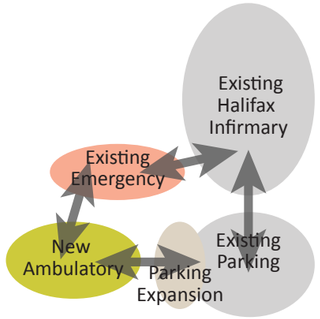
6.3 Test Fit Exploration B - Gateway Concept

6.3.5. Level 03



Test Fit B - New Program Summary		
	Area	
Use	M^2	SF
Inpatient	10,600	**114,097**
Perioperative	3,550	**38,212**
Clinical Support	350	**3,767**
Ambulatory Care	18,100	**194,827**
Research		**0**
Academic/Teaching		**0**
External Agency		**0**
Administration		**0**
Diognostic Imaging		**0**
Support Service	3,050	**32,830**
Retail		**0**
New Parking Spaces	+/- 430	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Below Grade

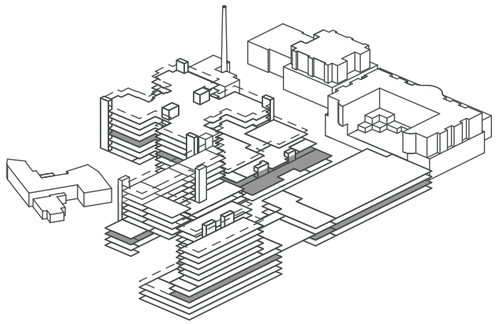
0m 10m 20m 30m 40m 50m 100m

Fig. 623 Test Fit Exploration B Level 03

Preliminary Test Fit - 2017.06.06

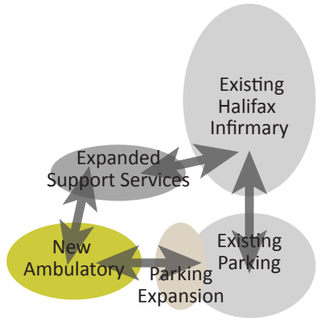
6.3 Test Fit Exploration B - Gateway Concept

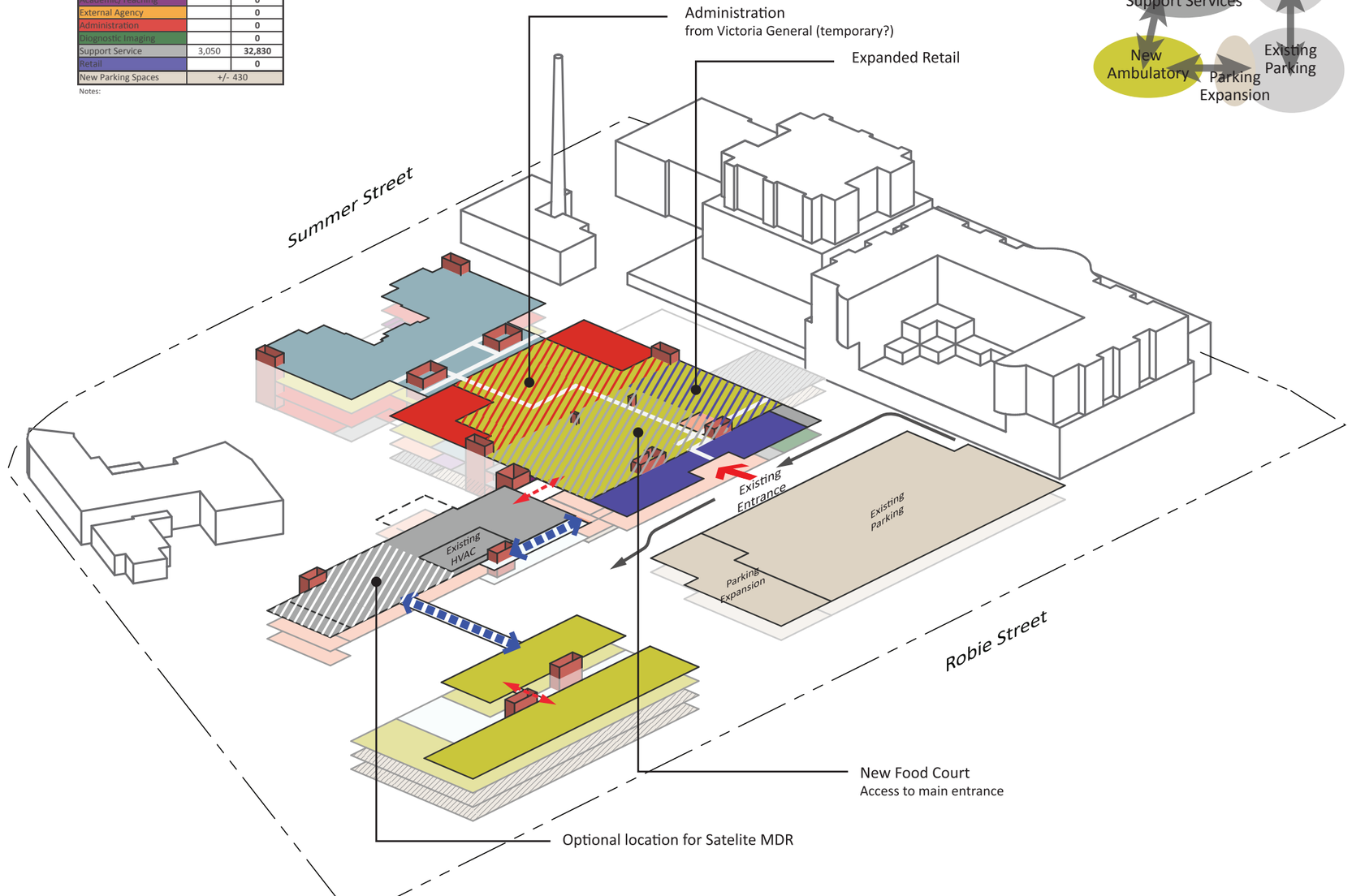
6.3.6. Level 04



Test Fit B - New Program Summary		
	Area	
Use	M^2	SF
Inpatient	10,600	**114,097**
Perioperative	3,550	**38,212**
Clinical Support	350	**3,767**
Ambulatory Care	18,100	**194,827**
Research		**0**
Academic/Teaching		**0**
External Agency		**0**
Administration		**0**
Diagnostic Imaging		**0**
Support Service	3,050	**32,830**
Retail		**0**
New Parking Spaces	+/- 430	

Notes:





- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

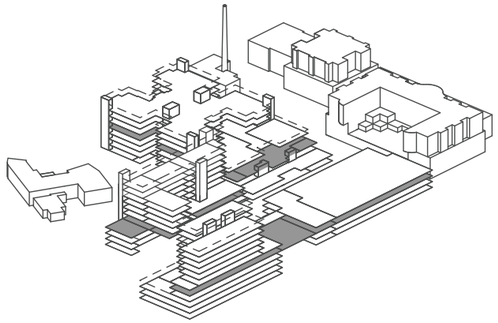
Below Grade

0m 10m 20m 30m 40m 50m 100m

Fig. 624 Test Fit Exploration B Level 04

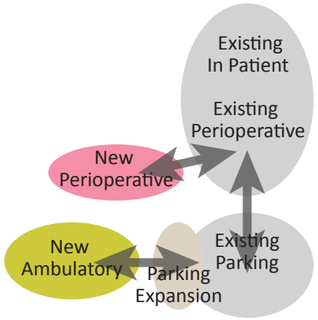
6.3 Test Fit Exploration B - Gateway Concept

6.3.7. Perioperative Level 05

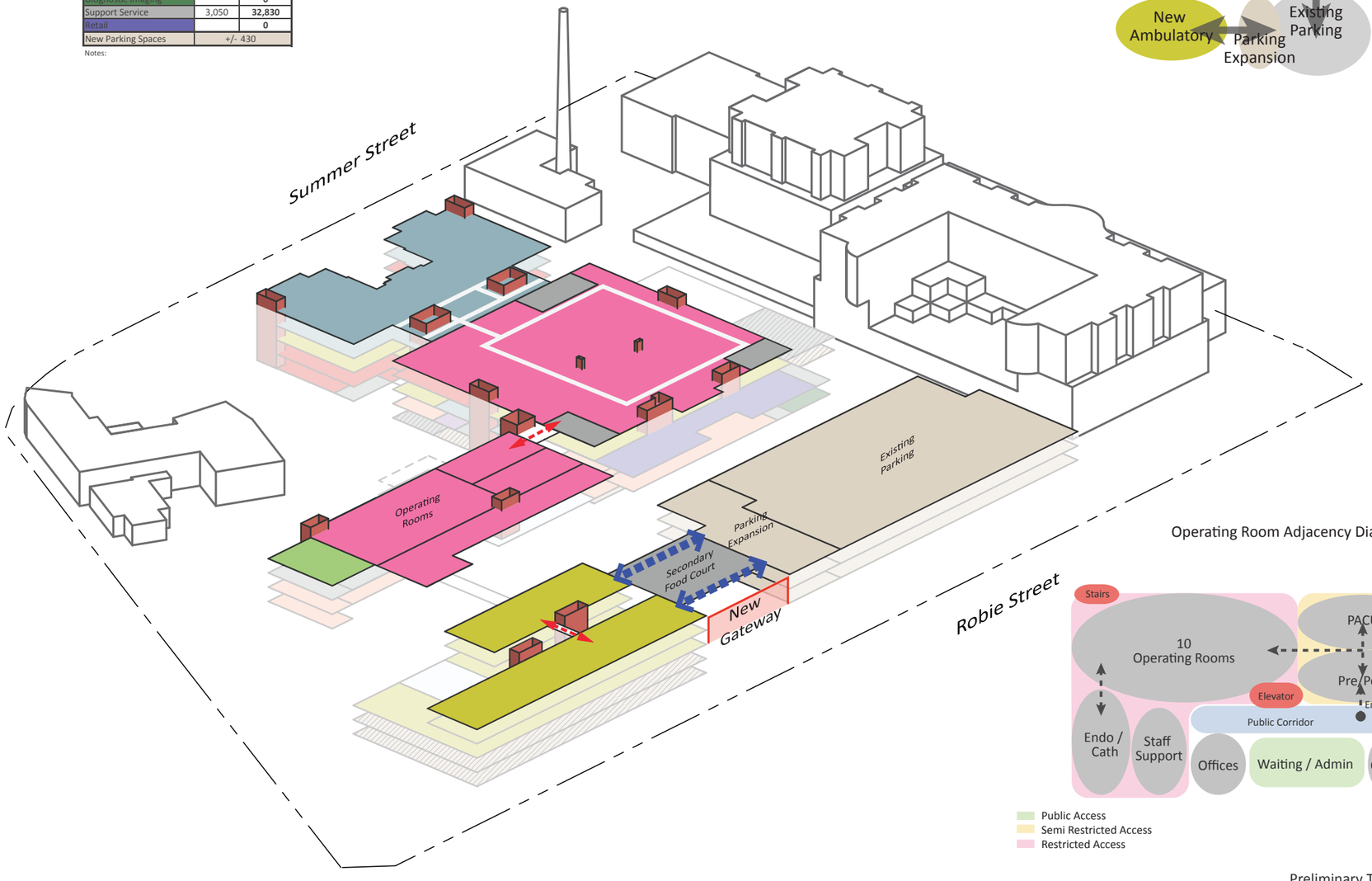


Test Fit B - New Program Summary		
	Area	
Use	M^2	SF
Inpatient	10,600	**114,097**
Perioperative	3,550	**38,212**
Clinical Support	350	**3,767**
Ambulatory Care	18,100	**194,827**
Research		**0**
Academic/Teaching		**0**
External Agency		**0**
Administration		**0**
Diognostic Imaging		**0**
Support Service	3,050	**32,830**
Retail		**0**
New Parking Spaces	+/- 430	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Operating Room Adjacency Diagram

Below Grade

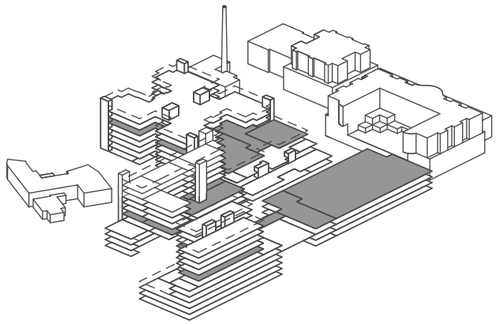
0m 10m 20m 30m 40m 50m 100m

Fig. 625 Test Fit Exploration B Perioperative Level 05

Preliminary Test Fit - 2017.06.06

6.3 Test Fit Exploration B - Gateway Concept

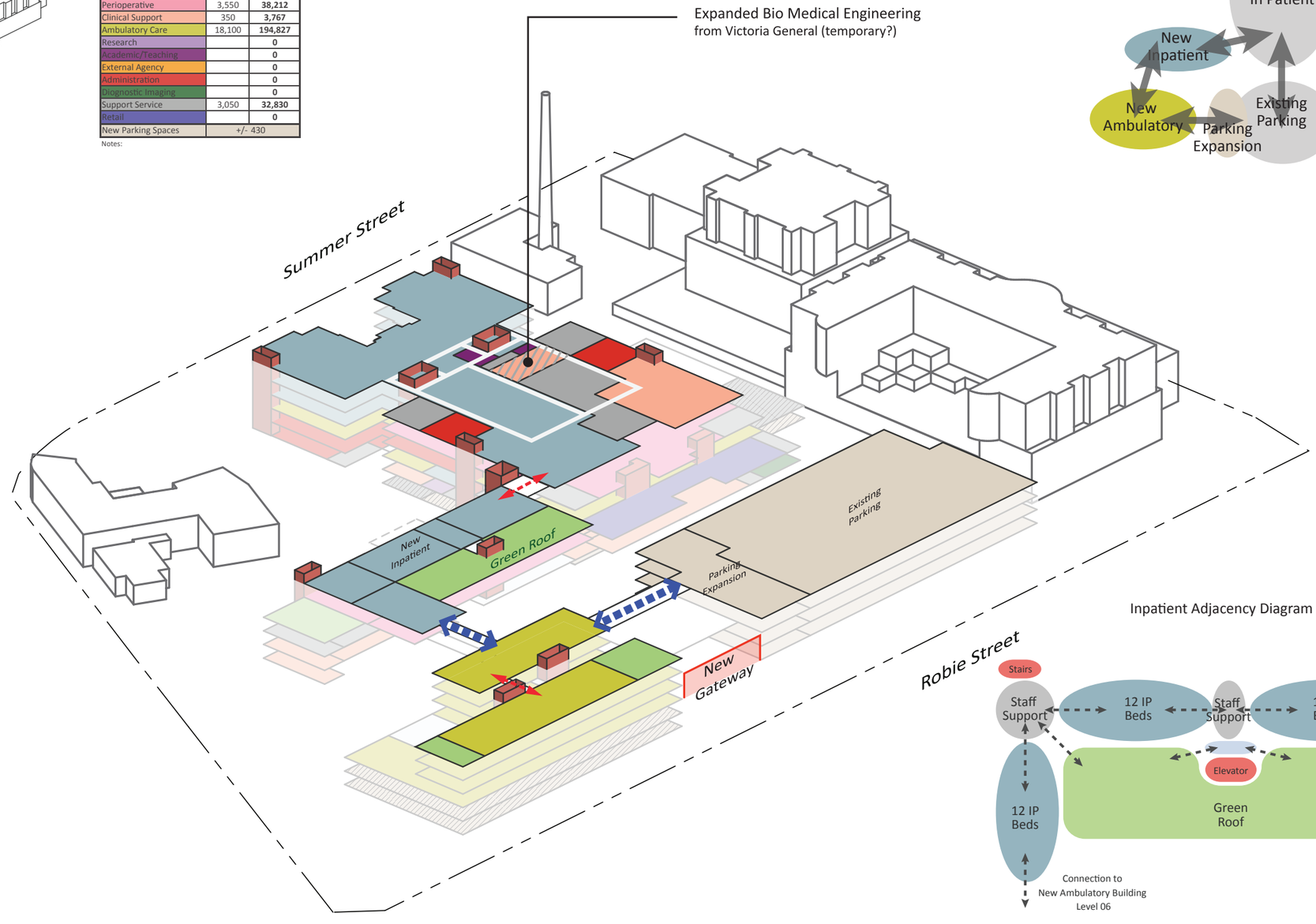
6.3.8. Inpatient Level 06



Test Fit B - New Program Summary		
	Area	
Use	M^2	SF
Inpatient	10,600	**114,097**
Perioperative	3,550	**38,212**
Clinical Support	350	**3,767**
Ambulatory Care	18,100	**194,827**
Research		**0**
Academic/Teaching		**0**
External Agency		**0**
Administration		**0**
Diognostic Imaging		**0**
Support Service	3,050	**32,830**
Retail		**0**
New Parking Spaces	+/- 430	

Notes:

- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Inpatient Adjacency Diagram

Below Grade

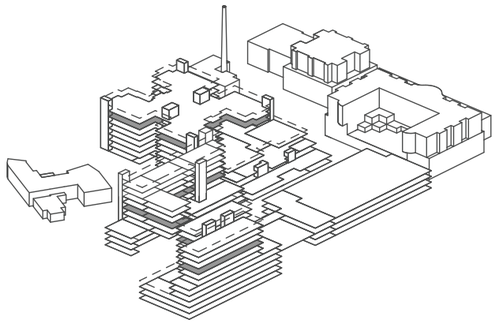
0m 10m 20m 30m 40m 50m 100m

Fig. 626 Test Fit Exploration B Inpatient Level 06

Preliminary Test Fit - 2017.06.06

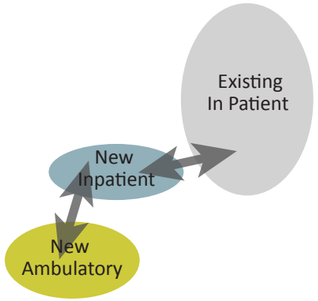
6.3 Test Fit Exploration B - Gateway Concept

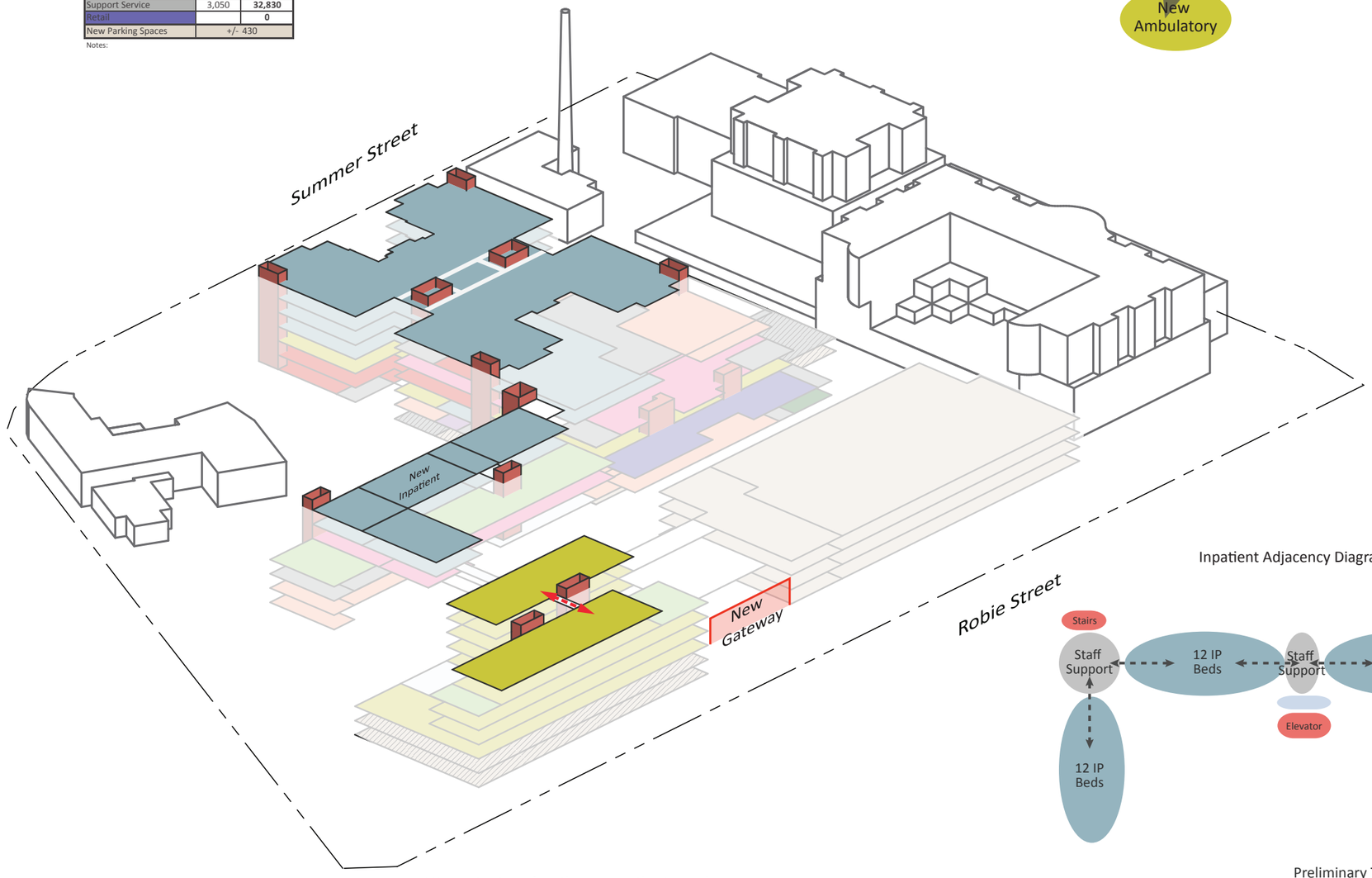
6.3.9. Inpatient Level (Typical)



Test Fit B - New Program Summary		
	Area	
Use	M^2	SF
Inpatient	10,600	**114,097**
Perioperative	3,550	**38,212**
Clinical Support	350	**3,767**
Ambulatory Care	18,100	**194,827**
Research		**0**
Academic/Teaching		**0**
External Agency		**0**
Administration		**0**
Diognostic Imaging		**0**
Support Service	3,050	**32,830**
Retail		**0**
New Parking Spaces	+/- 430	

Notes:





- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Inpatient Adjacency Diagram - Typical Units

Below Grade

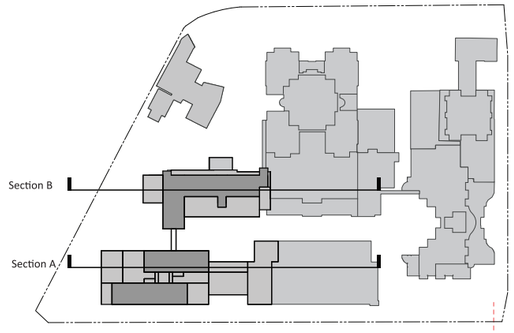
0m 10m 20m 30m 40m 50m 100m

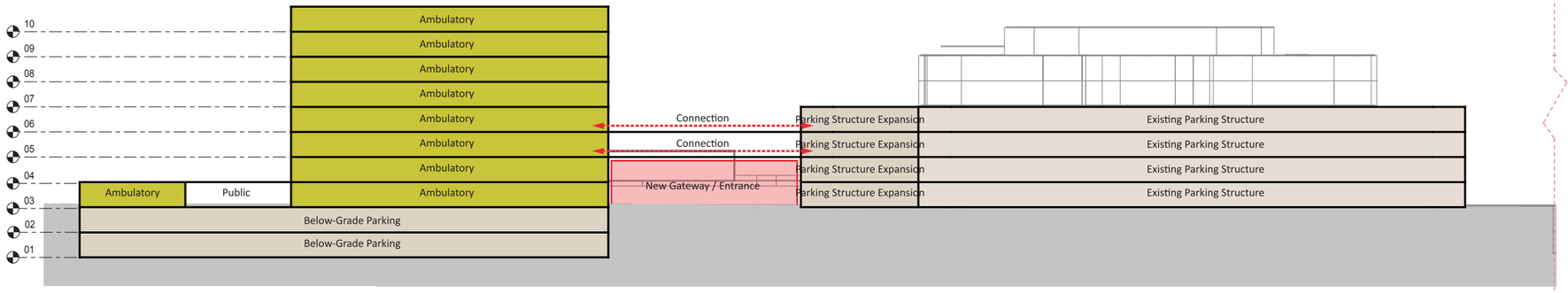
Fig. 627 Test Fit Exploration B Inpatient Level

Preliminary Test Fit - 2017.06.06

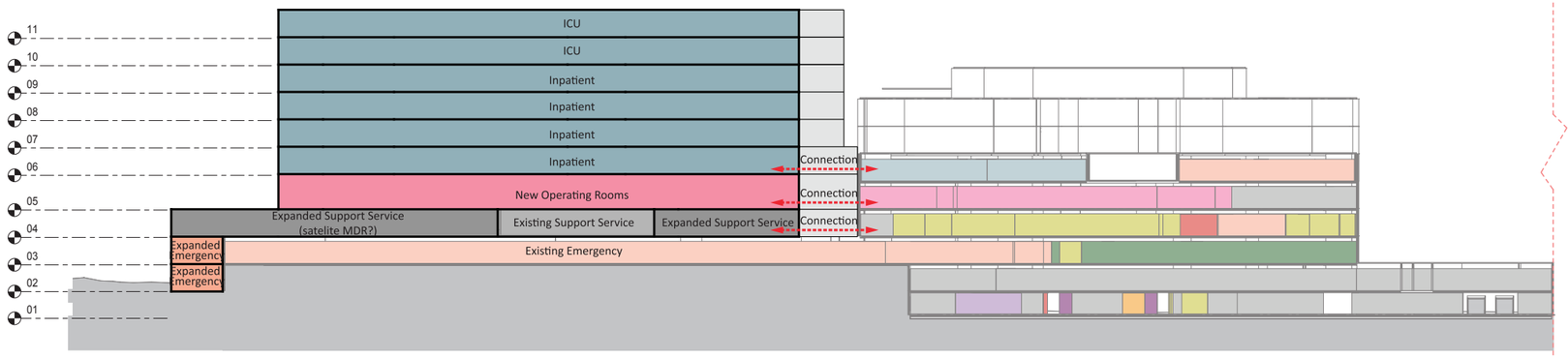
6.3 Test Fit Exploration B - Gateway Concept

6.3.10. Sections





Section A - Scale 1 : 500



Section B - Scale 1 : 500

Fig. 628 Test Fit Exploration B Sections

6.3 Test Fit Exploration B - Gateway Concept

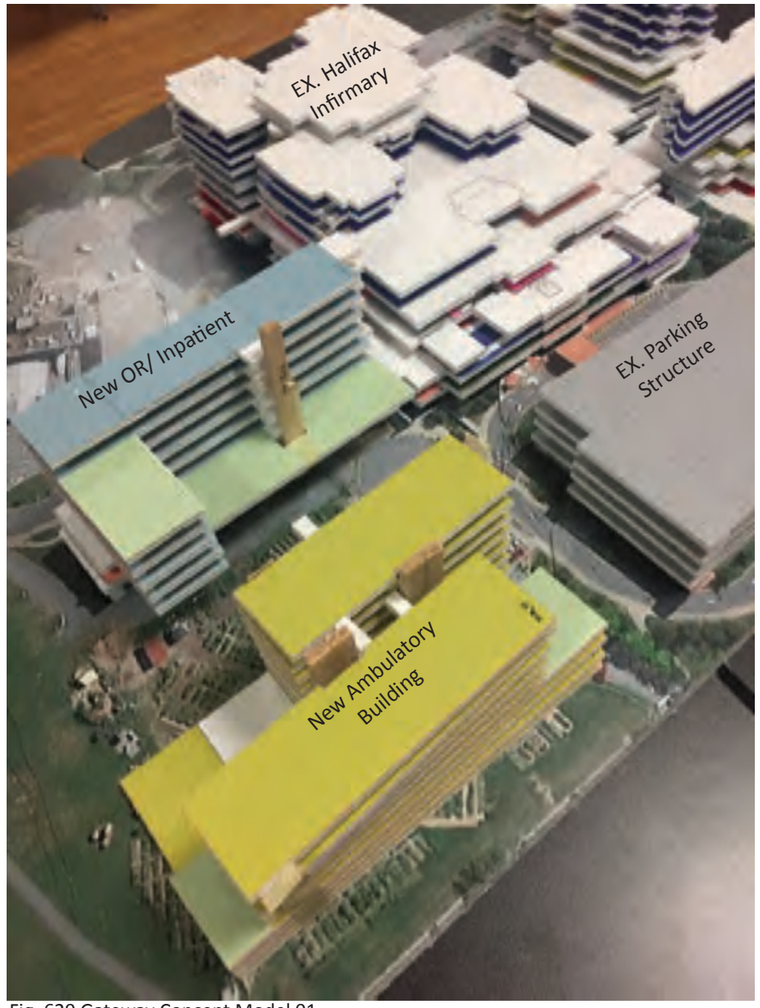


Fig. 629 Gateway Concept Model 01

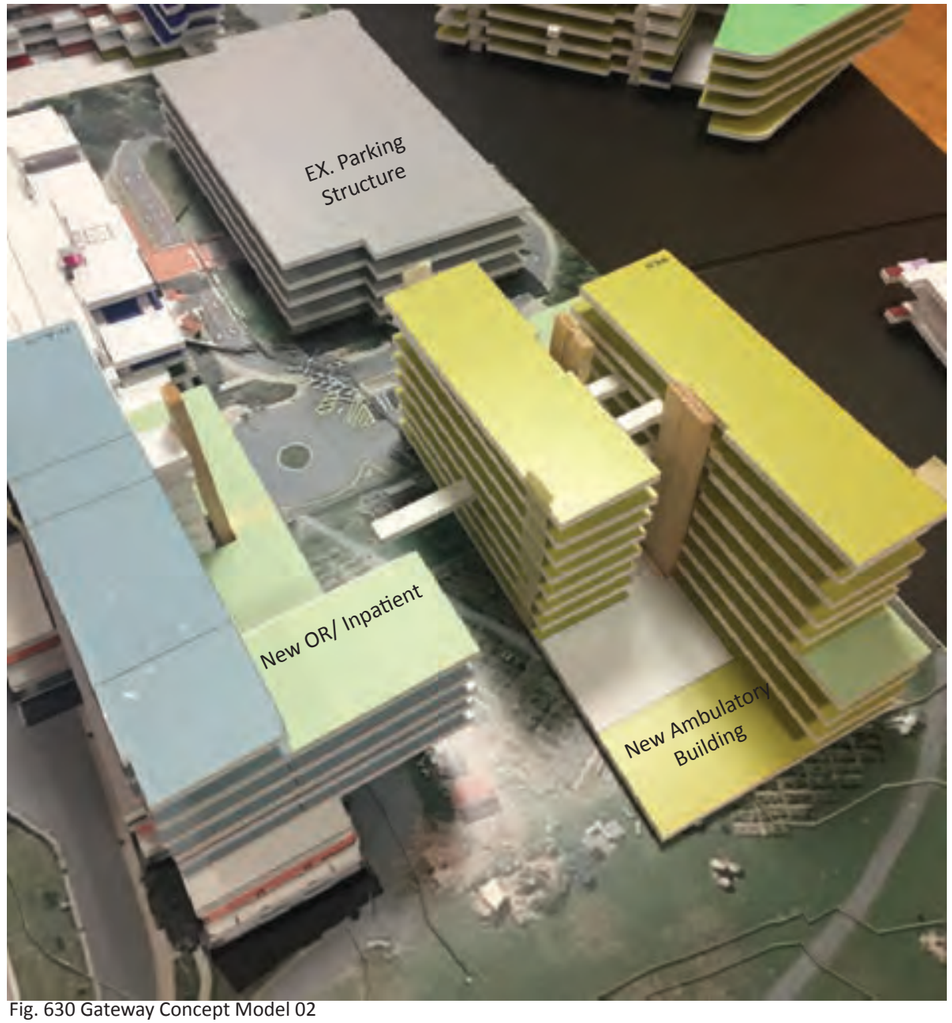
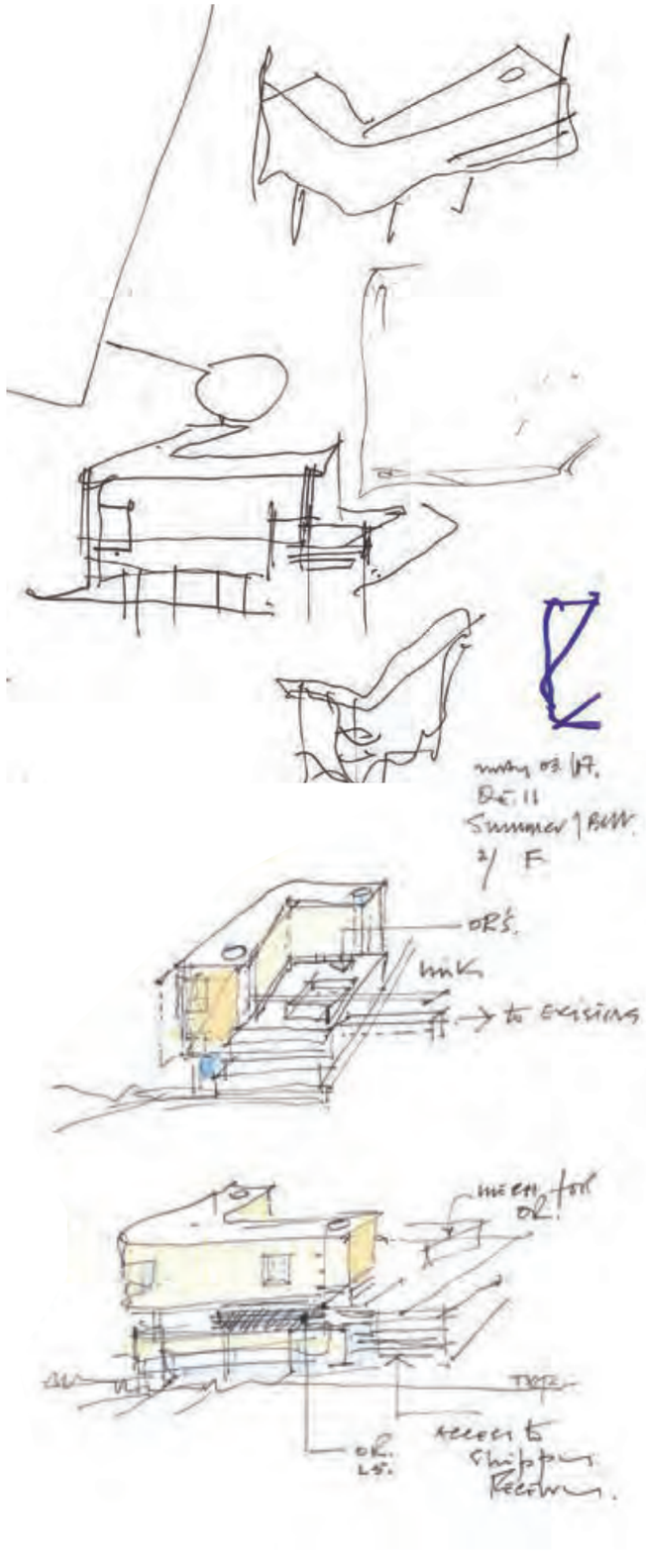


Fig. 630 Gateway Concept Model 02



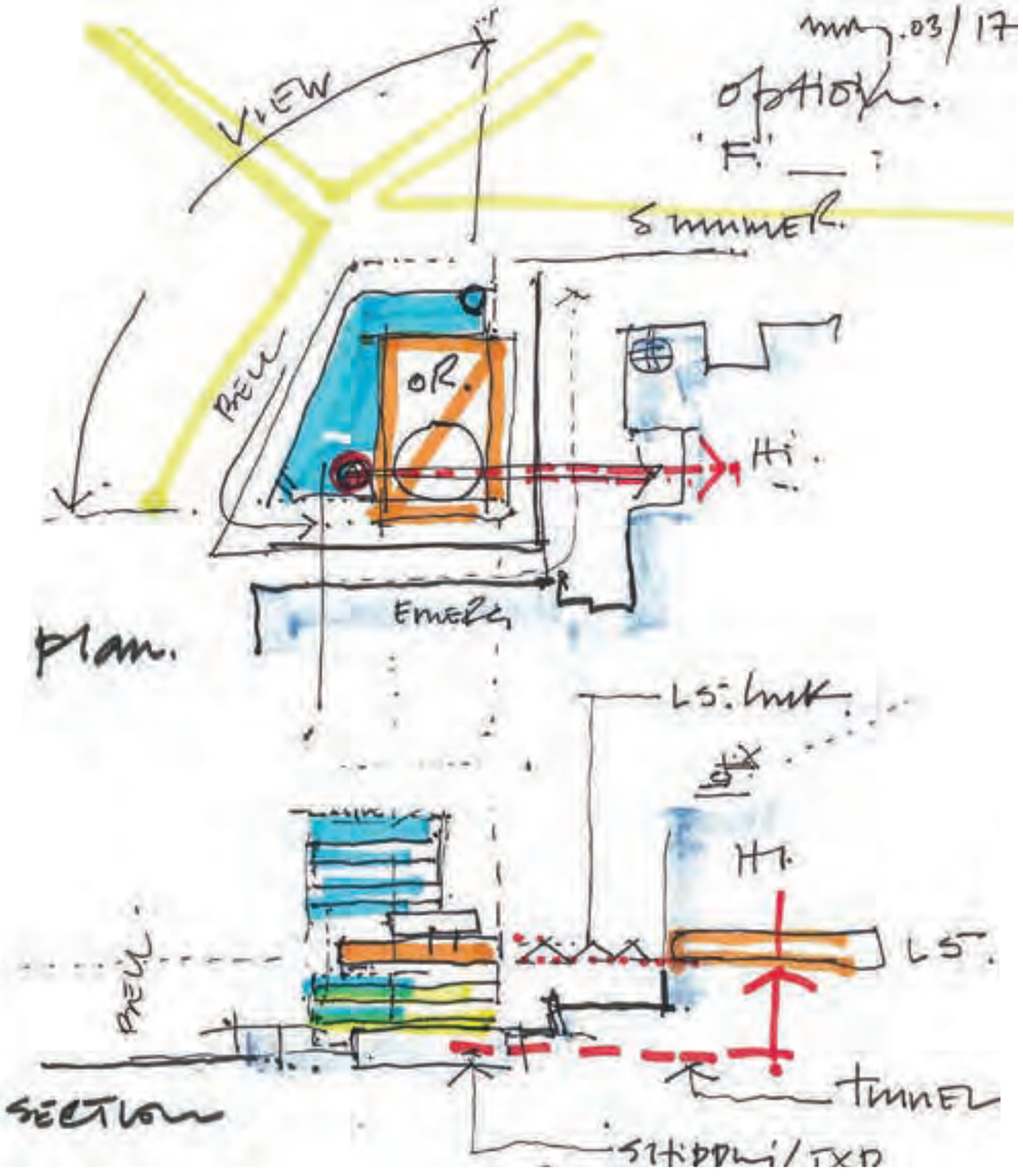


Fig. 631 Willow Tree Concept Sketches

D

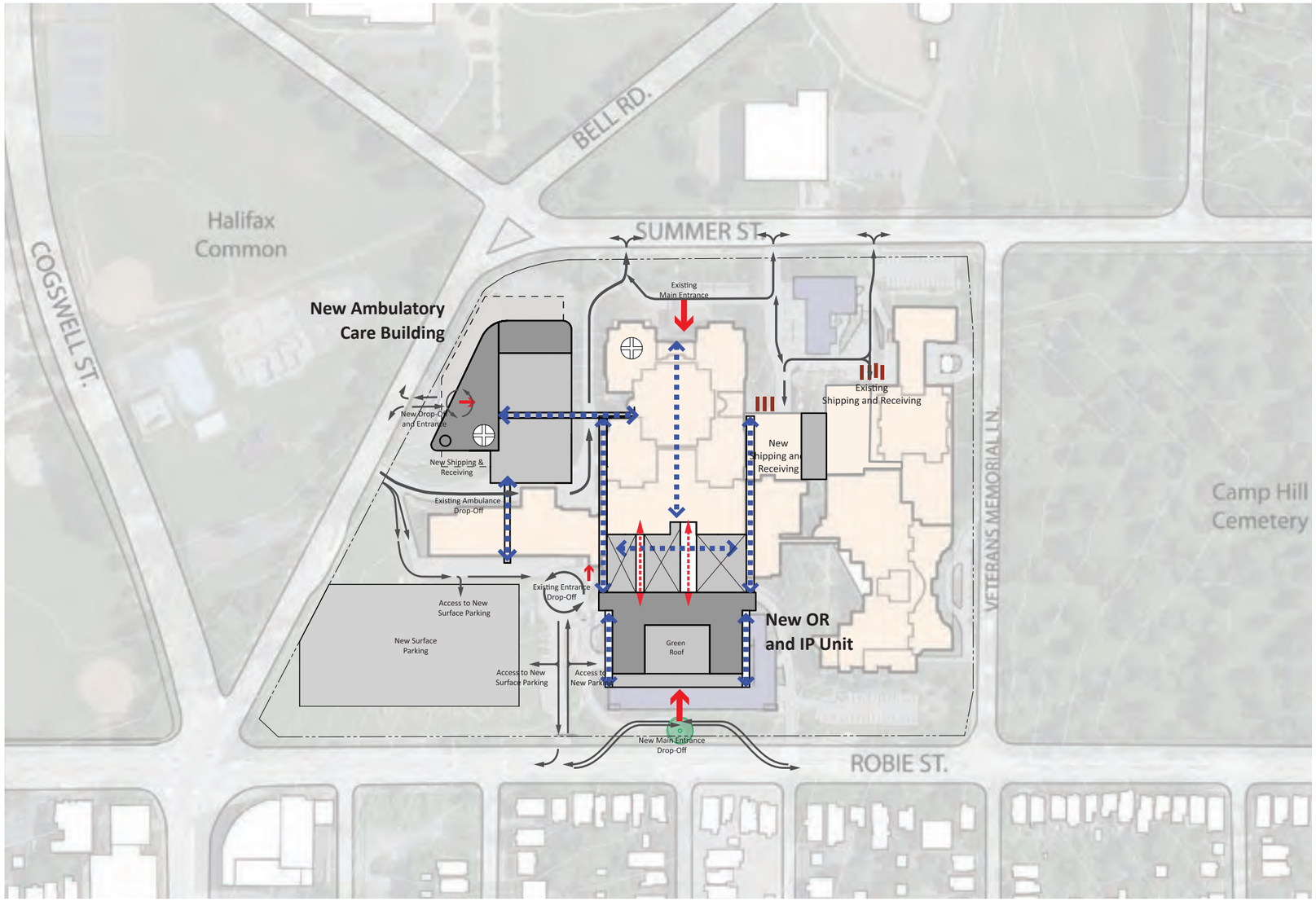
Willow Tree Concept

6.4 Test Fit Exploration D - Willow Tree Concept

6.4.1. Site Plan

- **Removal and relocation of existing parking structure**
- **New OR and IP building on existing parking structure site**
- **New Ambulatory building on CBC Site**

1. Immediate demolition of CBC
2. Clarity in way-finding
3. Lateral connectivity between new and existing
4. Oppportunities to capitalize on views
5. During construction the access and operation of existing Emergency is not impacted
6. While existing site circulation patterns are retained, a new identifiable main drop-off/entry is created along Robie Street
7. Current HI drop-off maintained during construction
8. Connection with new/existing Operating Rooms on Level 05 provided
9. Connection with new/existing Inpatient on Level 06 provided
10. Two levels of below-grade parking to bedrock following removal of contaminated soil when existing parking structure is moved
11. Creating an identifiable landmark Ambulatory Care which interacts with the street level
12. Existing circulation maintained, especially around the Emergency
13. Capitalize on grade change on CBC site
14. Urban farm relocated to Victoria General site
15. Current urban farm lot used for surface parking to offset the loss of parking with the removal of the parking structure on Robie Street

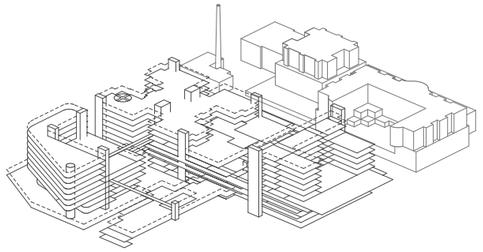


Preliminary Test Fit - 2017.06.06

Fig. 632 Test Fit Exploration D Site Plan

6.4 Test Fit Exploration D - Willow Tree Concept

6.4.2. Overall

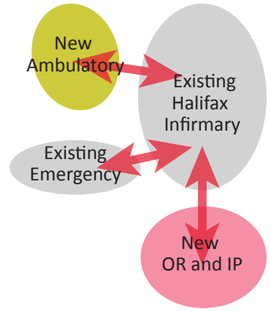


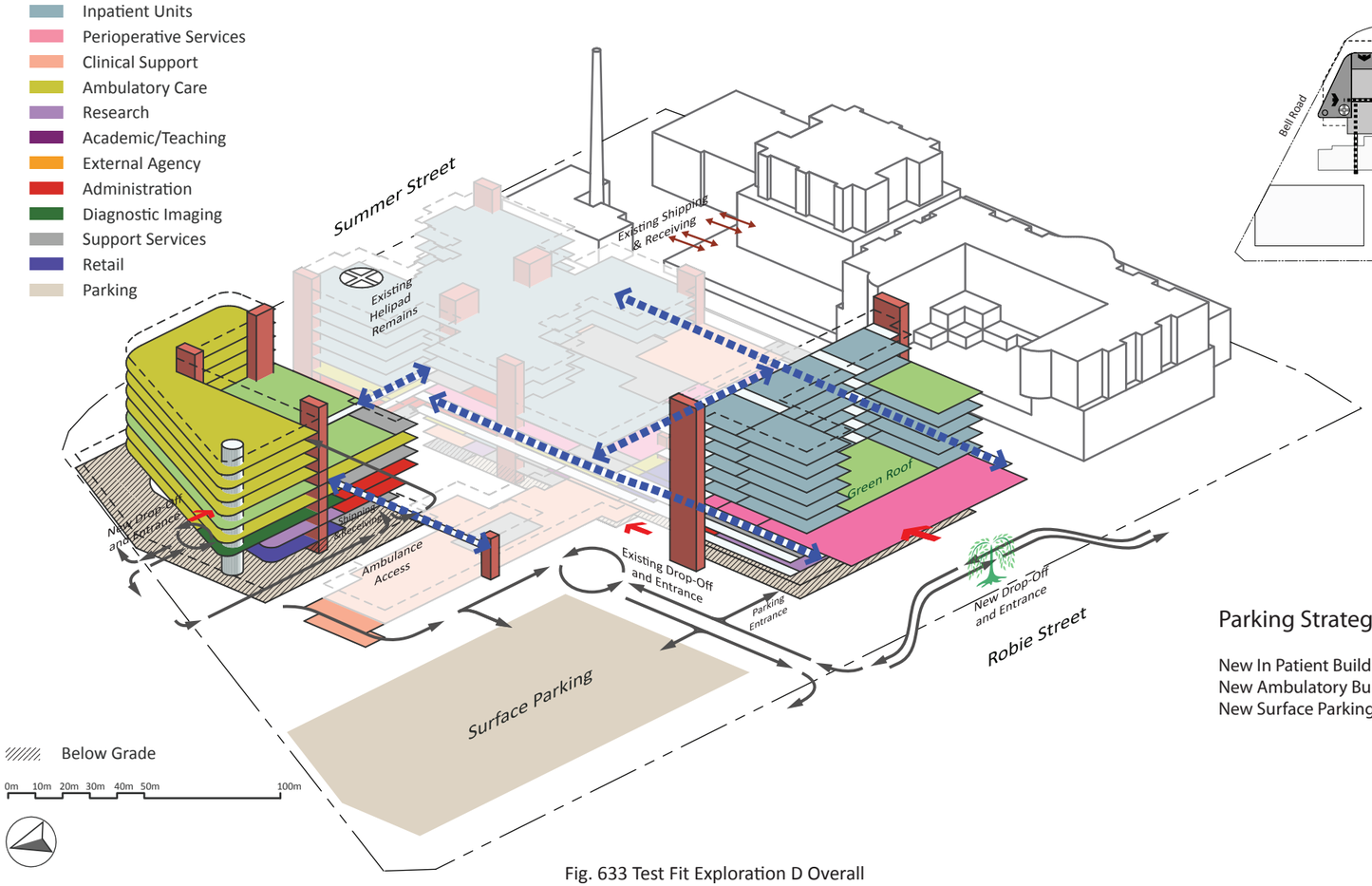
Test Fit D - New Program Summary		
	Area	
Use	M^2	SF
In Patient	11,200	**120,556**
Perioperative	4,450	**47,899**
Clinical Support	350	**3,767**
Ambulatory Care	17,050	**183,524**
Research	1,200	**12,917**
Academic/Teaching	1,100	**11,840**
External Agency		**0**
Administration	4,575	**49,245**
Diagnostic Imaging	1,200	**12,917**
Support Service	4,325	**46,554**
Retail	1,200	**12,917**
New Parking Spaces	+/- 760	

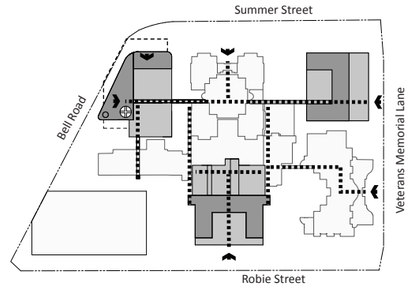
Notes:

New Ambulatory Care Building Program

- Diagnostic Imaging
- Medical Day Care Unit
- Nutrition / Food
- IT
- Public Areas
- Security
- Medical Offices
- Ambulatory Procedure Unit
- Dialysis
- Heart Health
- Clinics
- Eye Centre
- Hyperbaric
- Support Services







Parking Strategy

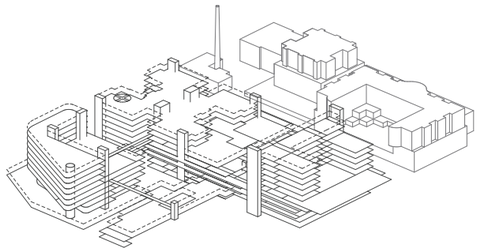
New In Patient Building Below Grade Parking	230
New Ambulatory Building Below Grade Parking	180
New Surface Parking Lot	350
Total	**+/-760**

Fig. 633 Test Fit Exploration D Overall

Preliminary Test Fit - 2017.06.06

6.4 Test Fit Exploration D - Willow Tree Concept

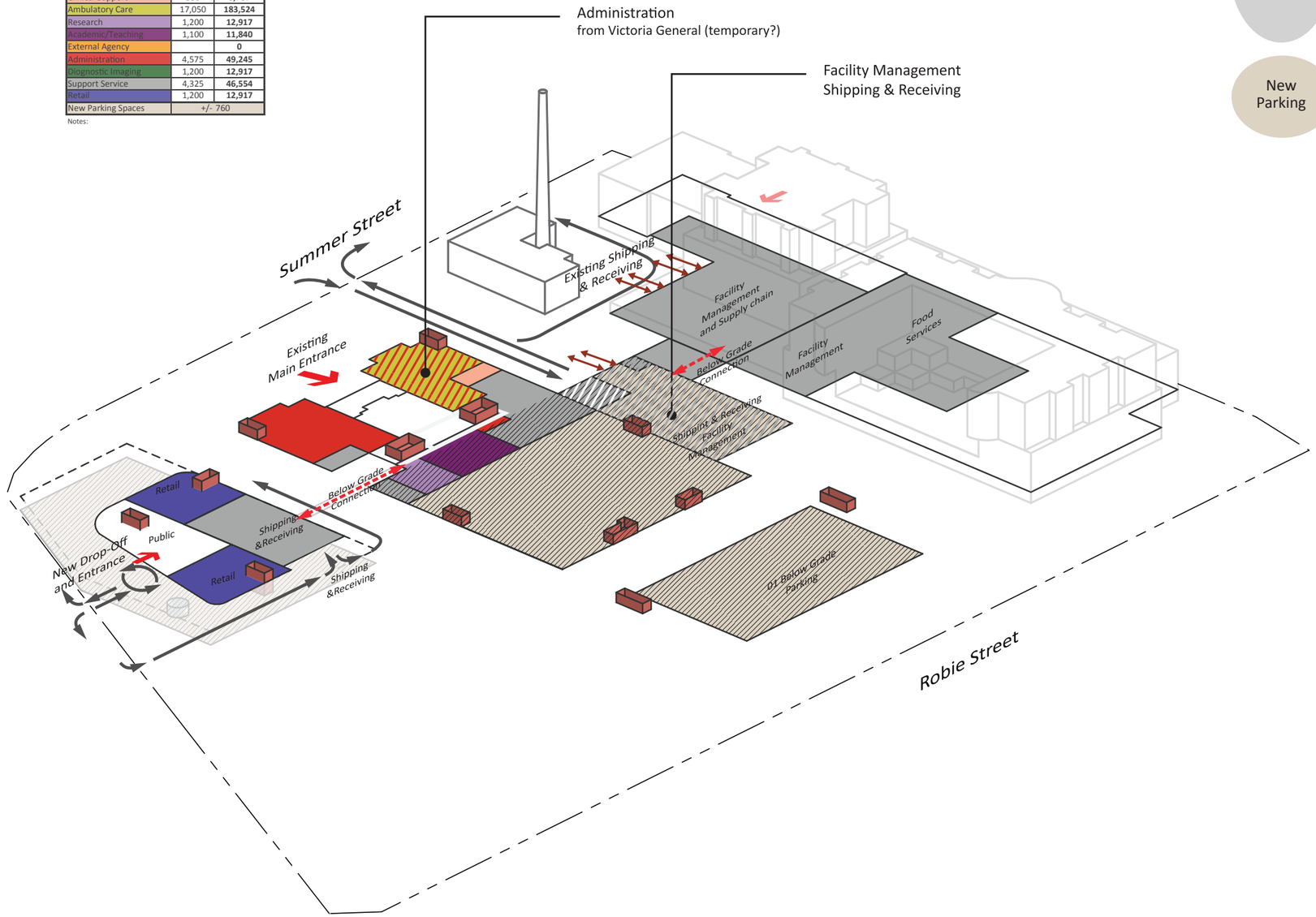
6.4.3. Level 01



Test Fit D - New Program Summary		
	Area	
Use	M^2	SF
In Patient	11,200	**120,556**
Perioperative	4,450	**47,899**
Clinical Support	350	**3,767**
Ambulatory Care	17,050	**183,524**
Research	1,200	**12,917**
Academic/Teaching	1,100	**11,840**
External Agency		**0**
Administration	4,575	**49,245**
Diagnostic Imaging	1,200	**12,917**
Support Service	4,325	**46,554**
Retail	1,200	**12,917**
New Parking Spaces	+/- 760	

Notes:

- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Below Grade

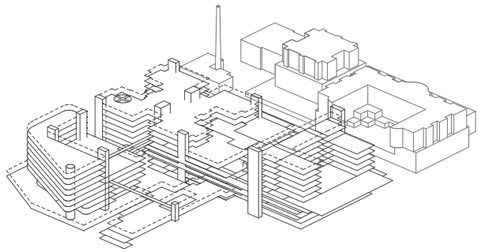
0m 10m 20m 30m 40m 50m 100m

Fig. 634 Test Fit Exploration D Level 01

Preliminary Test Fit - 2017.06.06

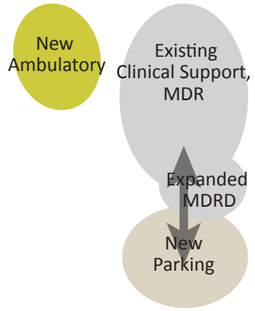
6.4 Test Fit Exploration D - Willow Tree Concept

6.4.4. Level 02



Test Fit D - New Program Summary		
	Area	
Use	M^2	SF
In Patient	11,200	**120,556**
Perioperative	4,450	**47,899**
Clinical Support	350	**3,767**
Ambulatory Care	17,050	**183,524**
Research	1,200	**12,917**
Academic/Teaching	1,100	**11,840**
External Agency		**0**
Administration	4,575	**49,245**
Diognostic Imaging	1,200	**12,917**
Support Service	4,325	**46,554**
Retail	1,200	**12,917**
New Parking Spaces	+/- 760	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

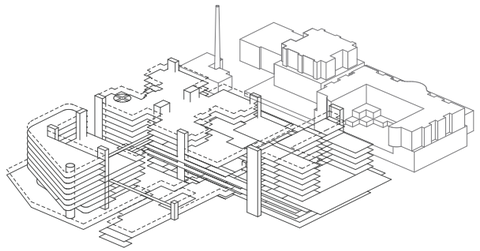
Below Grade

0m 10m 20m 30m 40m 50m 100m

Fig. 635 Test Fit Exploration D Level 02

6.4 Test Fit Exploration D - Willow Tree Concept

6.4.5. Level 03



Test Fit D - New Program Summary		
	Area	
Use	M^2	SF
In Patient	11,200	**120,556**
Perioperative	4,450	**47,899**
Clinical Support	350	**3,767**
Ambulatory Care	17,050	**183,524**
Research	1,200	**12,917**
Academic/Teaching	1,100	**11,840**
External Agency		**0**
Administration	4,575	**49,245**
Diagnostic Imaging	1,200	**12,917**
Support Service	4,325	**46,554**
Retail	1,200	**12,917**
New Parking Spaces	+/- 760	

Notes:

- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Below Grade

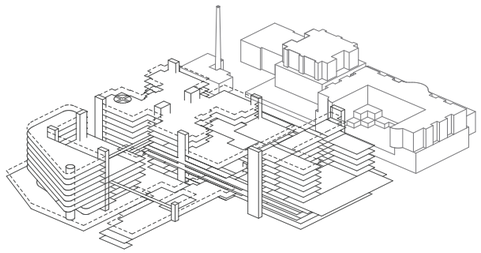
0m 10m 20m 30m 40m 50m 100m

Fig. 636 Test Fit Exploration D Level 03

Preliminary Test Fit - 2017.06.06

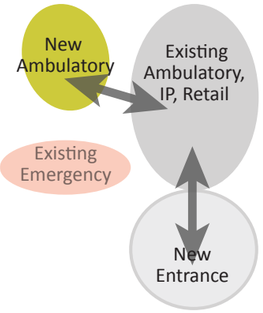
6.4 Test Fit Exploration D - Willow Tree Concept

6.4.6. Level 04

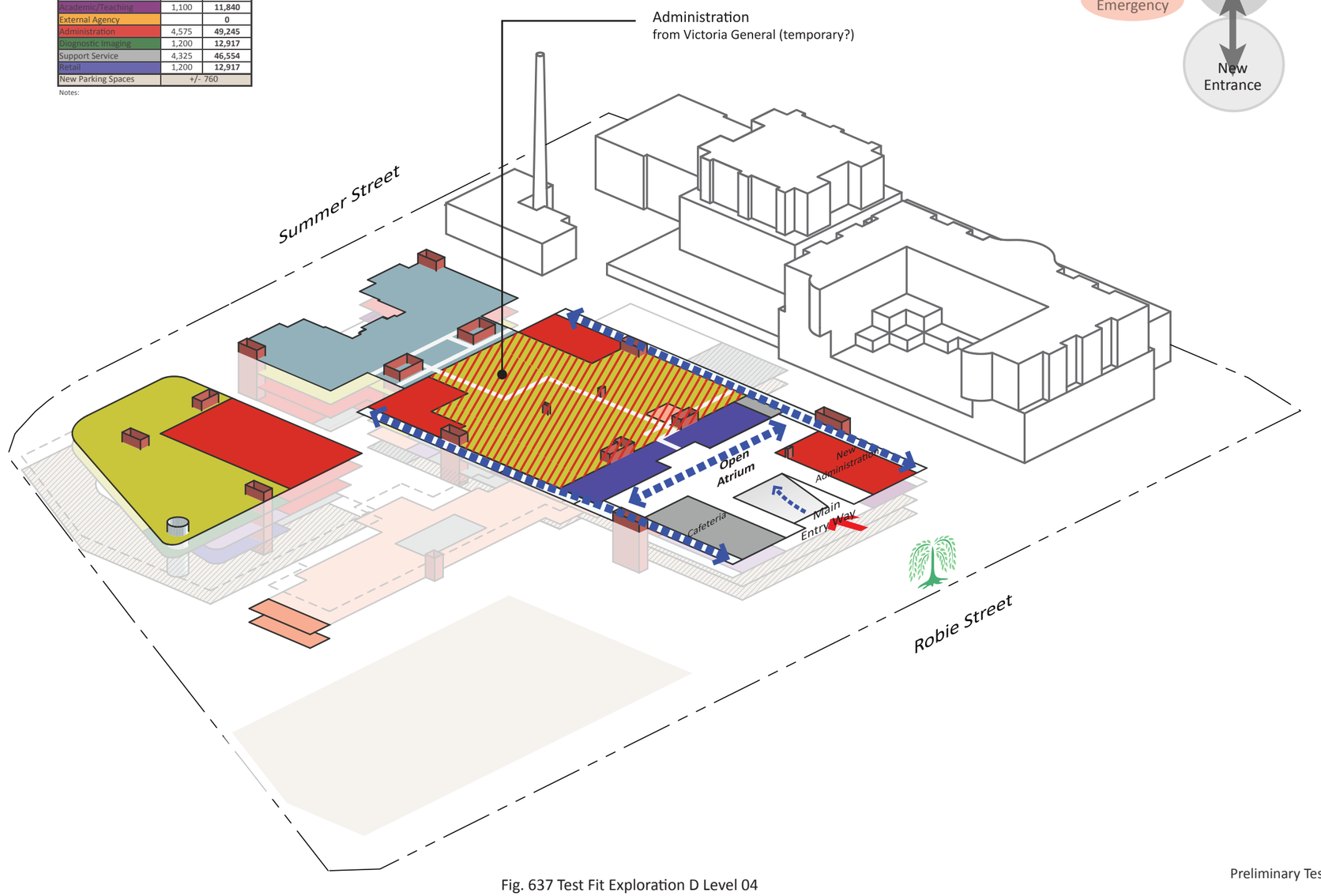


Test Fit D - New Program Summary		
	Area	
Use	M^2	SF
In Patient	11,200	**120,556**
Perioperative	4,450	**47,899**
Clinical Support	350	**3,767**
Ambulatory Care	17,050	**183,524**
Research	1,200	**12,917**
Academic/Teaching	1,100	**11,840**
External Agency		**0**
Administration	4,575	**49,245**
Diagnostic Imaging	1,200	**12,917**
Support Service	4,325	**46,554**
Retail	1,200	**12,917**
New Parking Spaces	+/- 760	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



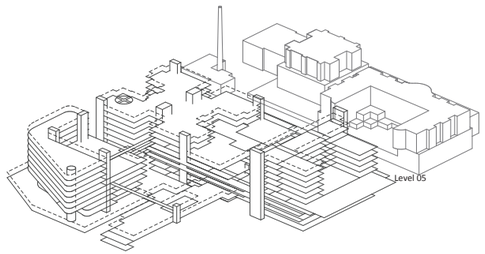
Below Grade

0m 10m 20m 30m 40m 50m 100m

Fig. 637 Test Fit Exploration D Level 04

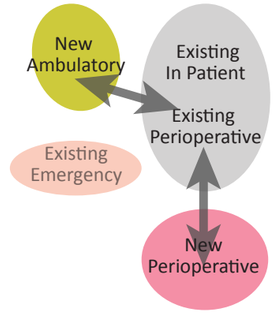
6.4 Test Fit Exploration D - Willow Tree Concept

6.4.7. Perioperative Level 05

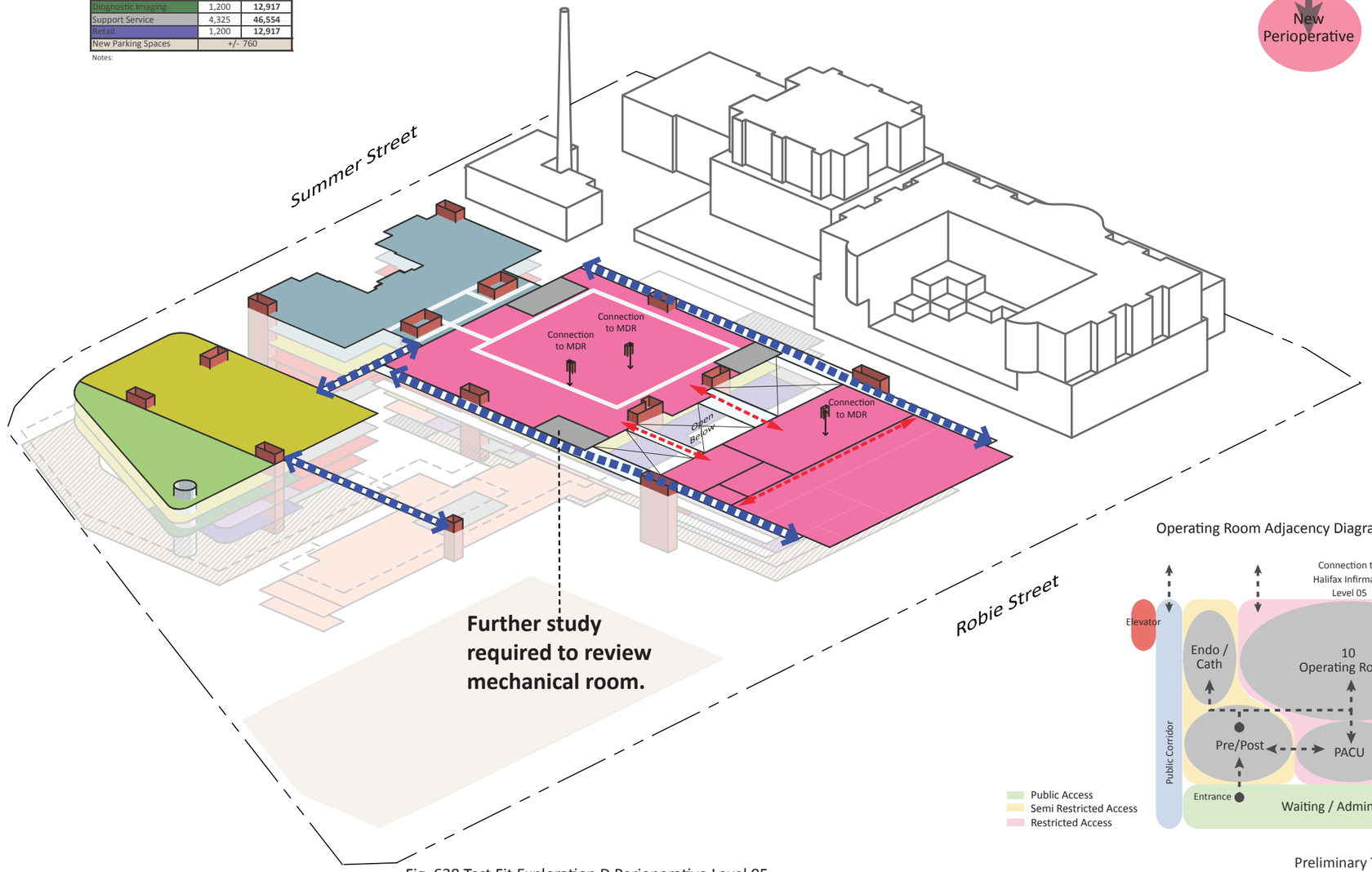


Test Fit D - New Program Summary		
	Area	
Use	M^2	SF
In Patient	11,200	**120,556**
Perioperative	4,450	**47,899**
Clinical Support	350	**3,767**
Ambulatory Care	17,050	**183,524**
Research	1,200	**12,917**
Academic/Teaching	1,100	**11,840**
External Agency		**0**
Administration	4,575	**49,245**
Diagnostic Imaging	1,200	**12,917**
Support Service	4,325	**46,554**
Retail	1,200	**12,917**
New Parking Spaces	+/- 760	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Operating Room Adjacency Diagram

Below Grade

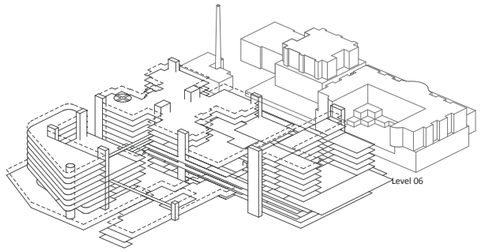
0m 10m 20m 30m 40m 50m 100m

Fig. 638 Test Fit Exploration D Perioperative Level 05

Preliminary Test Fit - 2017.06.06

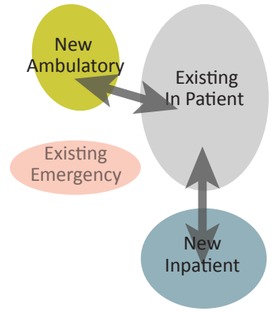
6.4 Test Fit Exploration D - Willow Tree Concept

6.4.8. Inpatient Level 06



Test Fit D - New Program Summary		
	Area	
Use	M^2	SF
In Patient	11,200	**120,556**
Perioperative	4,450	**47,899**
Clinical Support	350	**3,767**
Ambulatory Care	17,050	**183,524**
Research	1,200	**12,917**
Academic/Teaching	1,100	**11,840**
External Agency		**0**
Administration	4,575	**49,245**
Diognostic Imaging	1,200	**12,917**
Support Service	4,325	**46,554**
Retail	1,200	**12,917**
New Parking Spaces	+/- 760	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Inpatient Adjacency Diagram

Below Grade

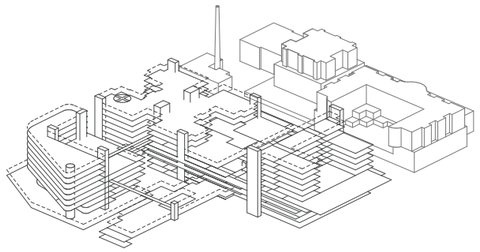
0m 10m 20m 30m 40m 50m 100m

Fig. 639 Test Fit Exploration D Inpatient Level 06

Preliminary Test Fit - 2017.06.06

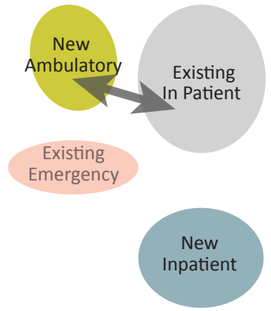
6.4 Test Fit Exploration D - Willow Tree Concept

6.4.9. Inpatient Level (Typical)

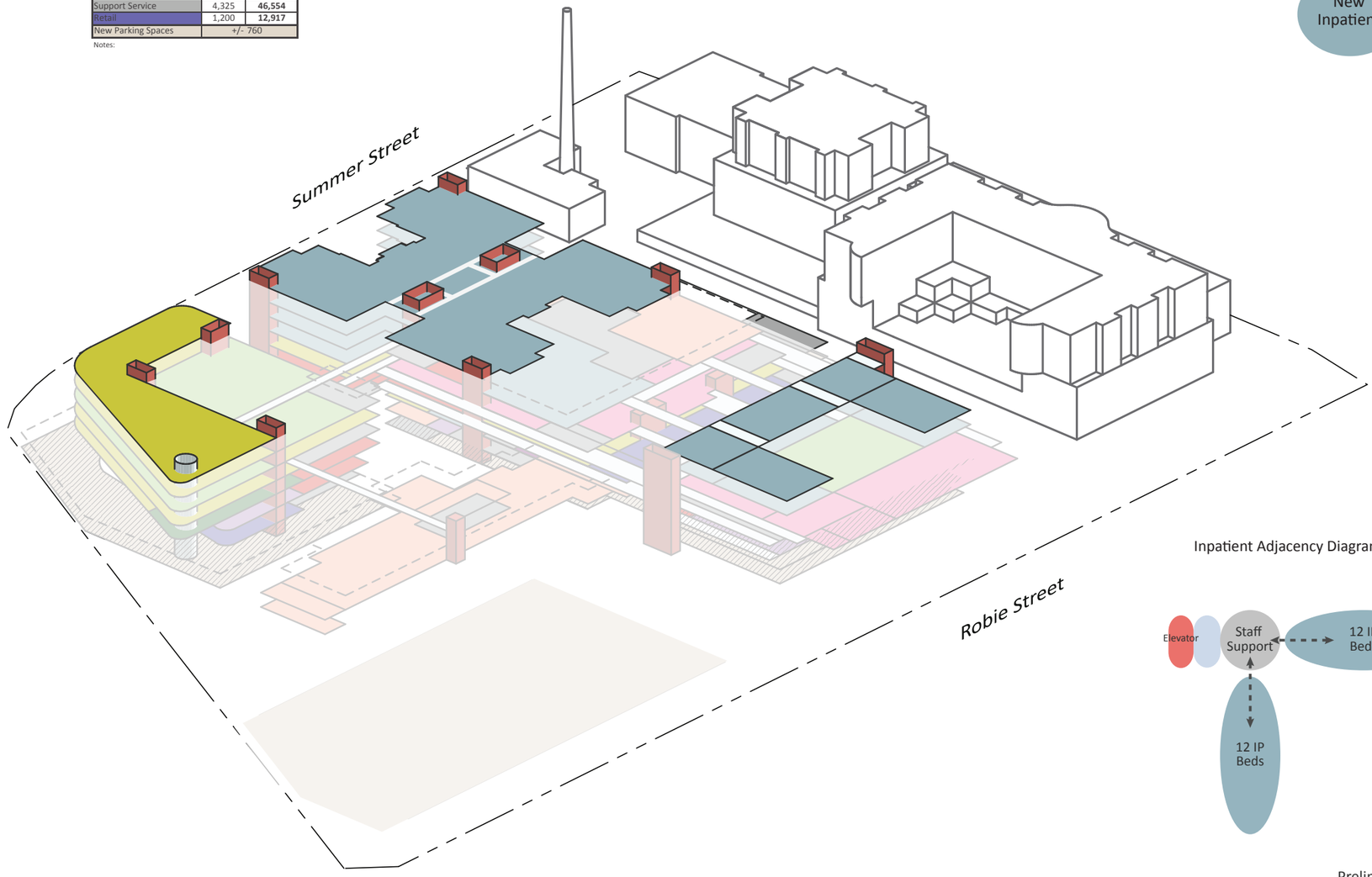


Test Fit D - New Program Summary		
	Area	
Use	M^2	SF
In Patient	11,200	**120,556**
Perioperative	4,450	**47,899**
Clinical Support	350	**3,767**
Ambulatory Care	17,050	**183,524**
Research	1,200	**12,917**
Academic/Teaching	1,100	**11,840**
External Agency		**0**
Administration	4,575	**49,245**
Diagnostic Imaging	1,200	**12,917**
Support Service	4,325	**46,554**
Retail	1,200	**12,917**
New Parking Spaces	+/- 760	

Notes:



- Inpatient Units
- Perioperative Services
- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Inpatient Adjacency Diagram

Below Grade

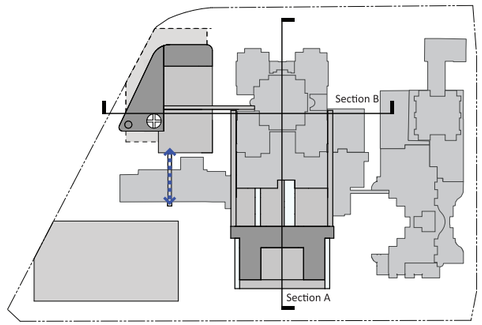
0m 10m 20m 30m 40m 50m 100m

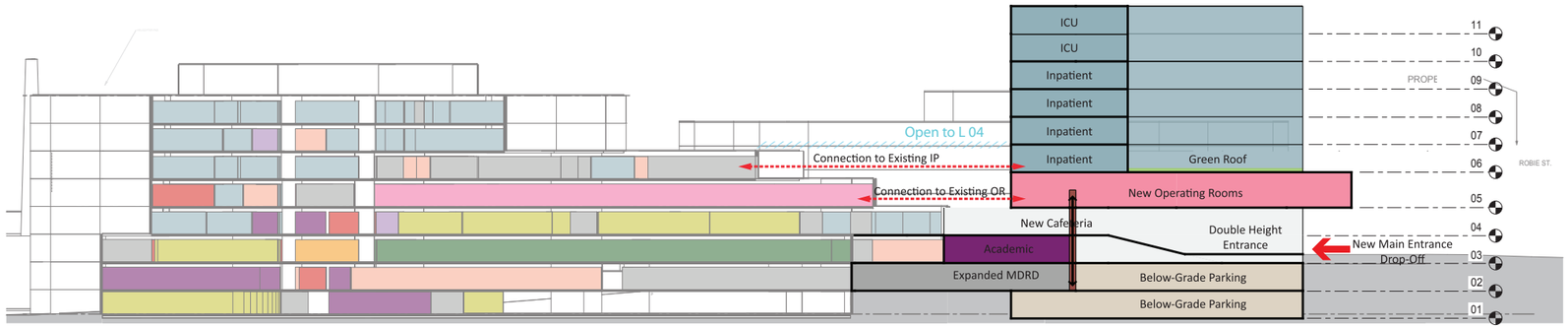
Fig. 640 Test Fit Exploration D Inpatient Level

Preliminary Test Fit - 2017.06.06

6.4 Test Fit Exploration D - Willow Tree Concept

6.4.10. Sections





Section A - Scale 1 : 500

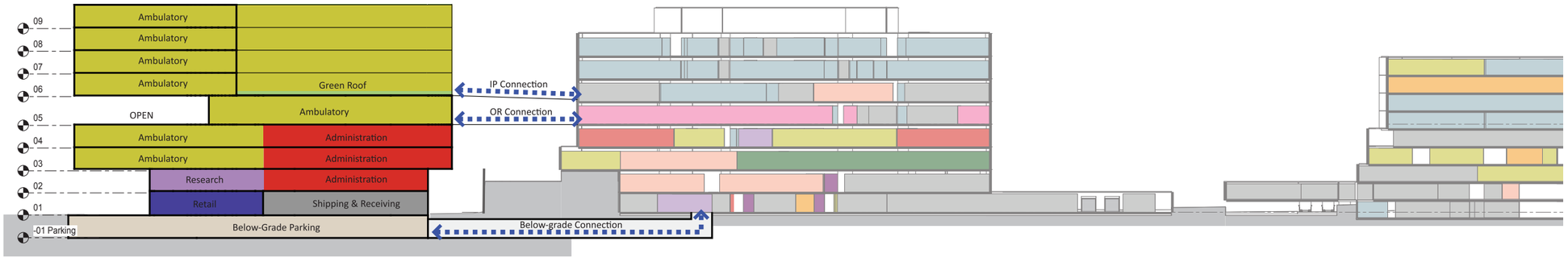


Fig. 641 Test Fit Exploration D Sections

Preliminary Test Fit - 2017.06.06

kasian

6.4 Test Fit Exploration D - Willow Tree Concept

Fig. 642 Willow Tree Concept Model 01

Showing the connectivity between existing and new perioperative services on Level 5

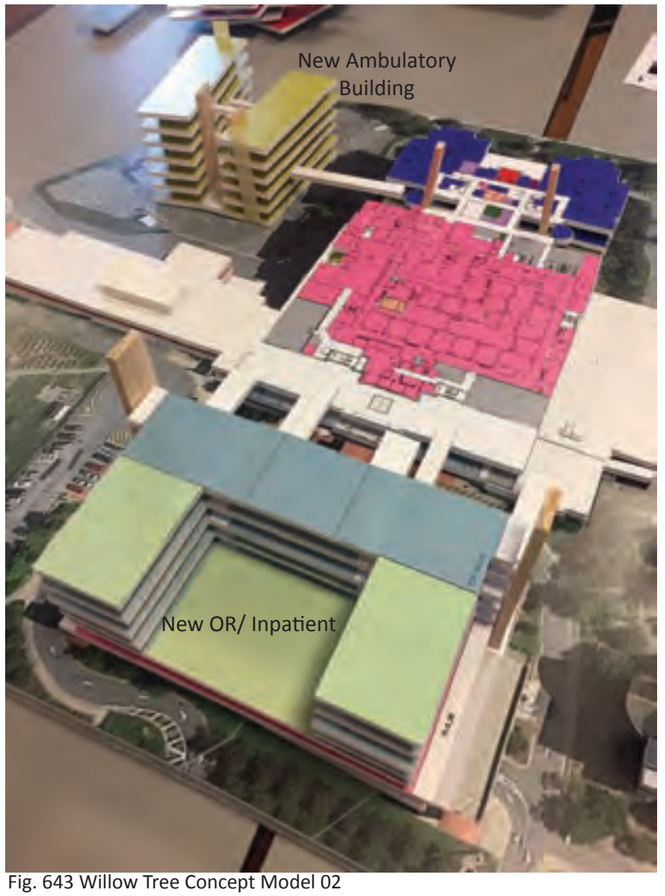


Fig. 643 Willow Tree Concept Model 02

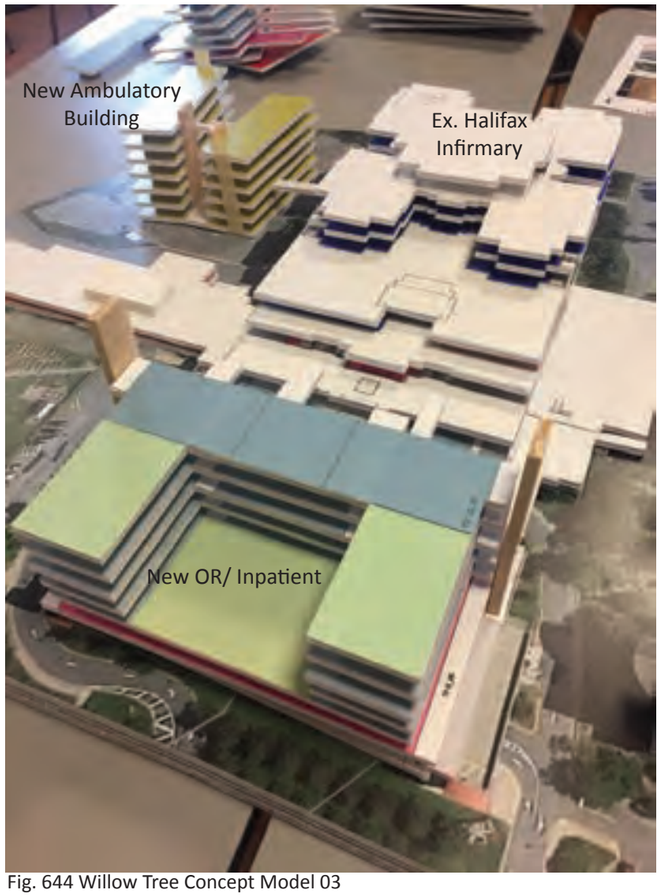


Fig. 644 Willow Tree Concept Model 03

6.4 Test Fit Exploration D - Willow Tree Concept

Fig. 645 Willow Tree Concept Model 04

Showing new inpatient unit floor plate which maximizes natural light and views.

Fig. 646 Willow Tree Concept Model 05

Showing linkages between new OR/ Inpatient building on Robie St to existing Halifax Infirmary Building

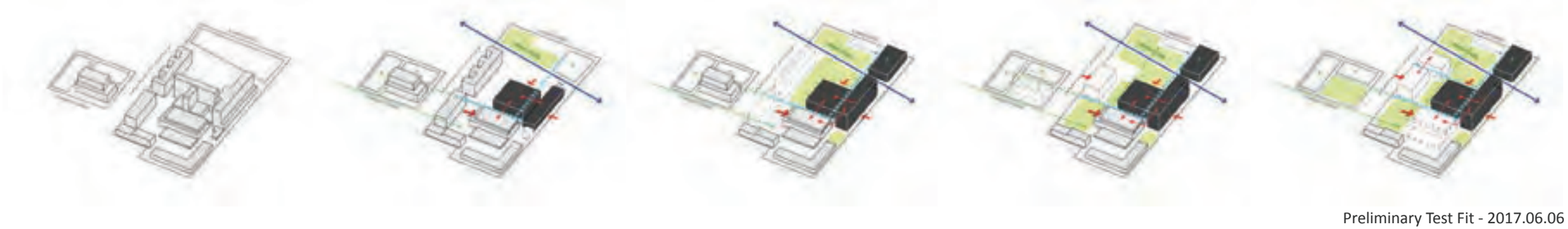
6.5
Victoria General (Dickson Building)

6.5 Victoria General (Dickson Building)

6.5.1. Site Plan

- **Demolition and Removal of Victoria and Centennial**
- **New Lobby**
- **New Below Grade and Surface Parking Lots**
- **New Greenspace**

1. Demolition of Victoria and Centennial Buildings
2. Construct new below grade parking by capitalizing on excavation left behind from Victoria Building
3. Create new Lobby and Vertical Circulation for Dickson building with views of adjacent green space and entrances
4. Reorganization of vehicular circulation
5. New Entrances and extended drop off to Dickson
6. New surface parking on top of below grade parking
7. Temporary surface parking on Centennial site
8. Centennial site retained for future development
9. Substantial new green space
10. Relocate Urban Garden from HI Site



Preliminary Test Fit - 2017.06.06

Fig. 647 Dickson Building Site Plan

6.5 Victoria General (Dickson Building)

6.5.2. Overall

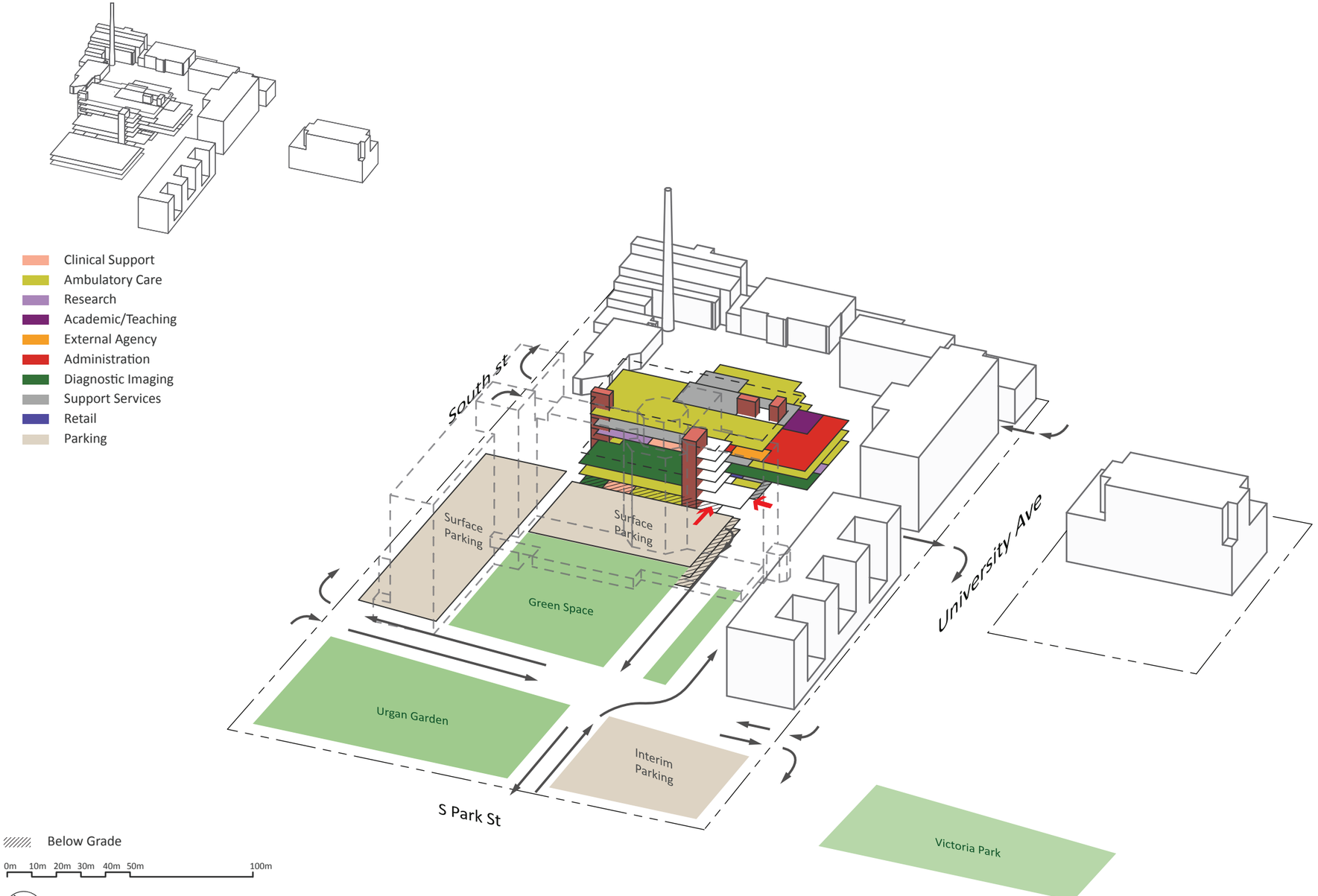
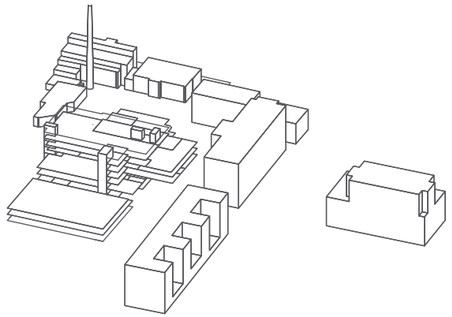


Fig. 648 Dickson Building Overall

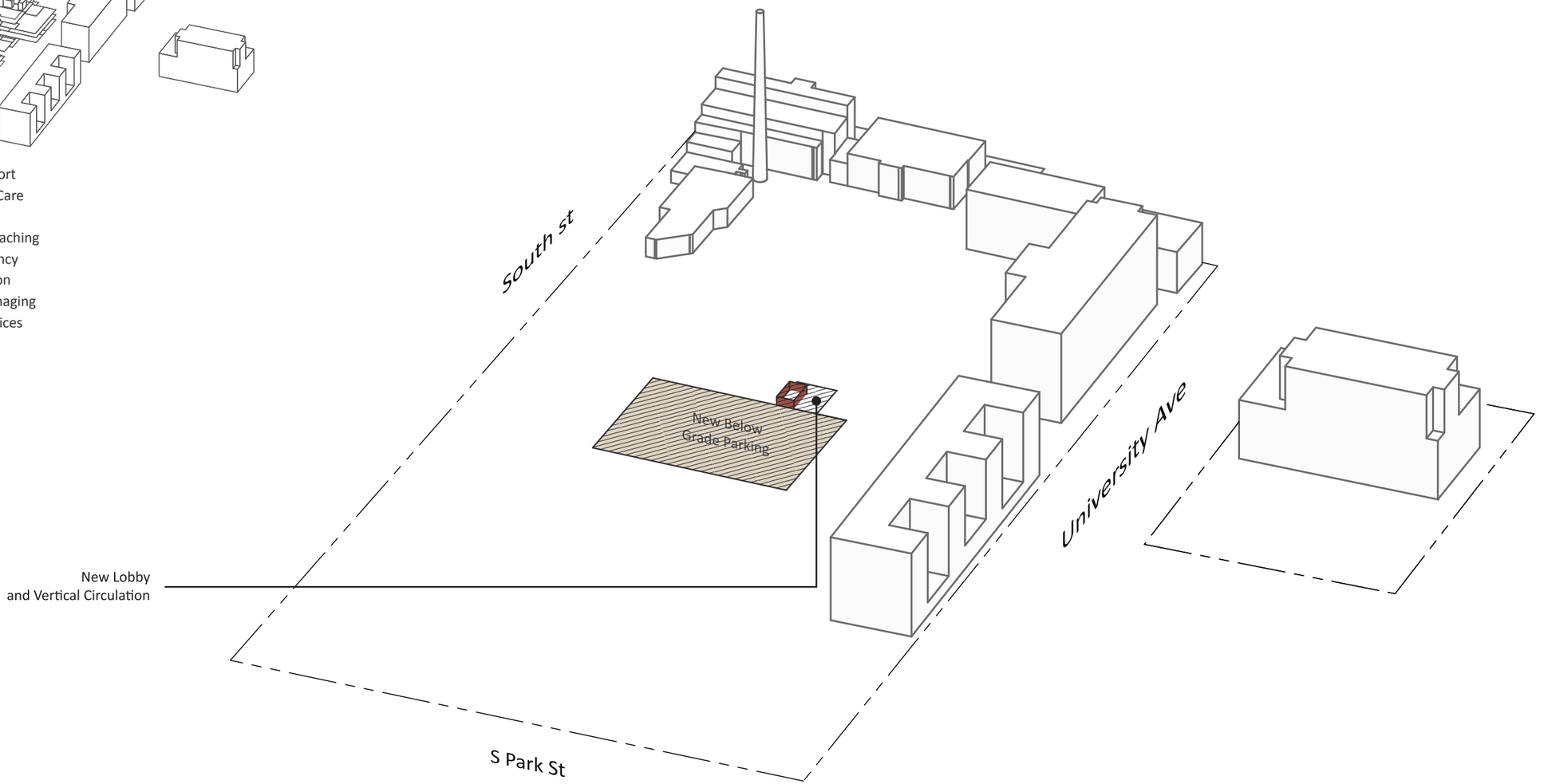
Preliminary Test Fit - 2017.06.06

6.5 Victoria General (Dickson Building)

6.5.3. Level B0



- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking



Below Grade

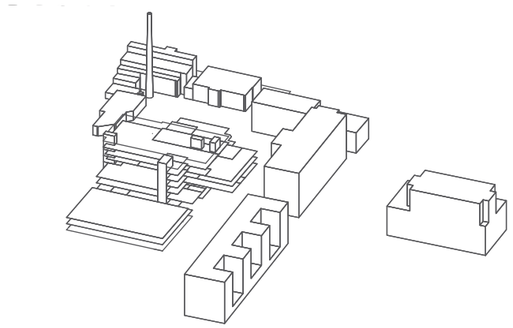
0m 10m 20m 30m 40m 50m 100m

Fig. 649 Dickson Building Level B0

Preliminary Test Fit - 2017.06.06

6.5 Victoria General (Dickson Building)

6.5.4. Level 01



- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Non Cancer Care Programs Moving Out
- Respiratory Clinical Support
- Respiratory Therapy Work Area

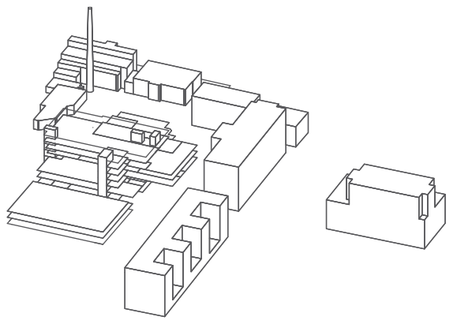
Below Grade

0m 10m 20m 30m 40m 50m 100m

Fig. 650 Dickson Building Level 01

6.5 Victoria General (Dickson Building)

6.5.5. Level 02



Clinical Support
Ambulatory Care
Research
Academic/Teaching
External Agency
Administration
Diagnostic Imaging
Support Services
Retail
Parking

Below Grade

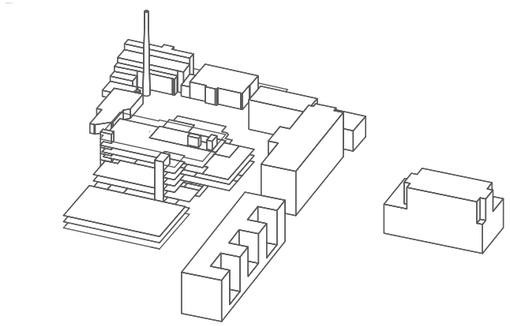
0m 10m 20m 30m 40m 50m 100m

Fig. 651 Dickson Building Level 02

Preliminary Test Fit - 2017.06.06

6.5 Victoria General (Dickson Building)

6.5.6. Level 03



- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Medical Physics & Tech Support
CT Simulation Suite
Dosimetry
Systemic Oncology
Radiation Treatment and Support Sta
Patient Review
Pharmacy

South st

Surface Parking

Surface Parking

Green Space

University Ave

New Lobby
and Vertical Circulation

Green Space

Interim Parking

S Park St

Victoria Park

Non Cancer Care Programs Moving Out
- Clinic E.N.T.
- Clinic E.N.T. Administration
- E.N.T. Research
- External Agency Nova Scotia Hearing & Speech Clinig

Below Grade

0m 10m 20m 30m 40m 50m 100m

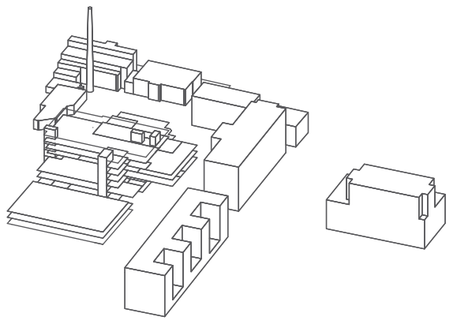
Fig. 652 Dickson Building Level 03

Preliminary Test Fit - 2017.06.06

kasian

6.5 Victoria General (Dickson Building)

6.5.7. Level 04



- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Below Grade

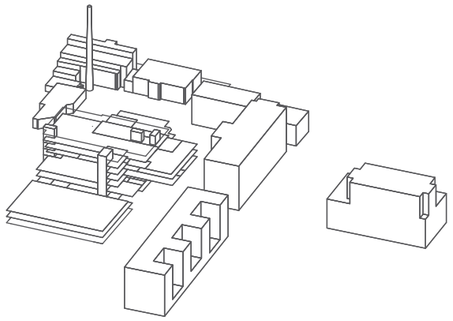
0m 10m 20m 30m 40m 50m 100m

Fig. 653 Dickson Building Level 04

Preliminary Test Fit - 2017.06.06

6.5 Victoria General (Dickson Building)

6.5.8. Level 05



- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Below Grade

0m 10m 20m 30m 40m 50m 100m

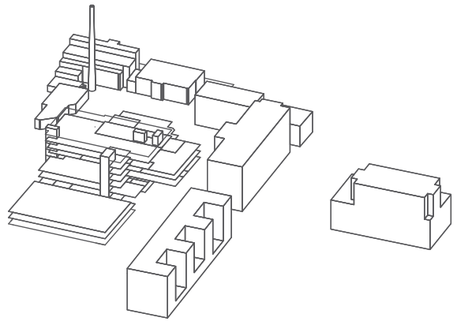
Fig. 654 Dickson Building Level 05

Preliminary Test Fit - 2017.06.06

kasian

6.5 Victoria General (Dickson Building)

6.5.9. Level 06



- Clinical Support
- Ambulatory Care
- Research
- Academic/Teaching
- External Agency
- Administration
- Diagnostic Imaging
- Support Services
- Retail
- Parking

Available Space
Program - TBD

Medical Staff Facilities

South st

Surface Parking

Surface Parking

Green Space

New Lobby
and Vertical Circulation

Green Space

Interim Parking

S Park St

University Ave

Victoria Park

Non Cancer Care Programs Moving Out
- Dialysis Hemodialysis Clinic

Below Grade

0m 10m 20m 30m 40m 50m 100m

Fig. 655 Dickson Building Level 06

Preliminary Test Fit - 2017.06.06

6.5 Victoria General (Dickson Building)

Precedent Images: Hospital in the Park

The New Hvidovre Hospital / Hvidovre, Denmark /
SHL architects

Southeast Louisiana Veterans Health Care System / Louisiana, USA /
NBBj

The New Hvidovre Hospital / Hvidovre, Denmark /
SHL architects

kasian

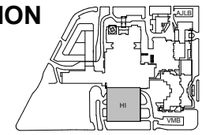
6.6

Opportunities & Constraints Within Existing Hospital

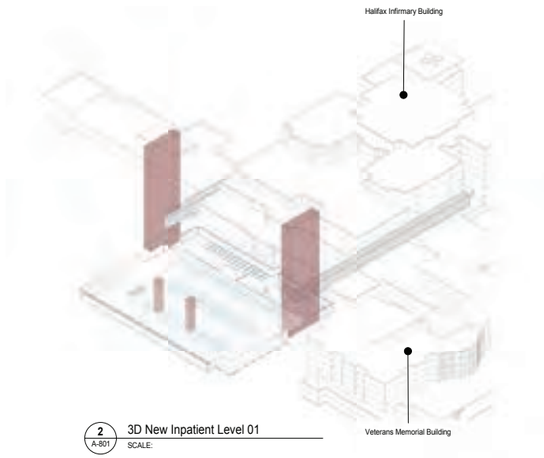
6.6 Opportunities & Constraints Within Existing Hospital

6.6.1. HI Level 01

WILLOW TREE OPTION



KEY PLAN- HALIFAX INFIRMARY SITE



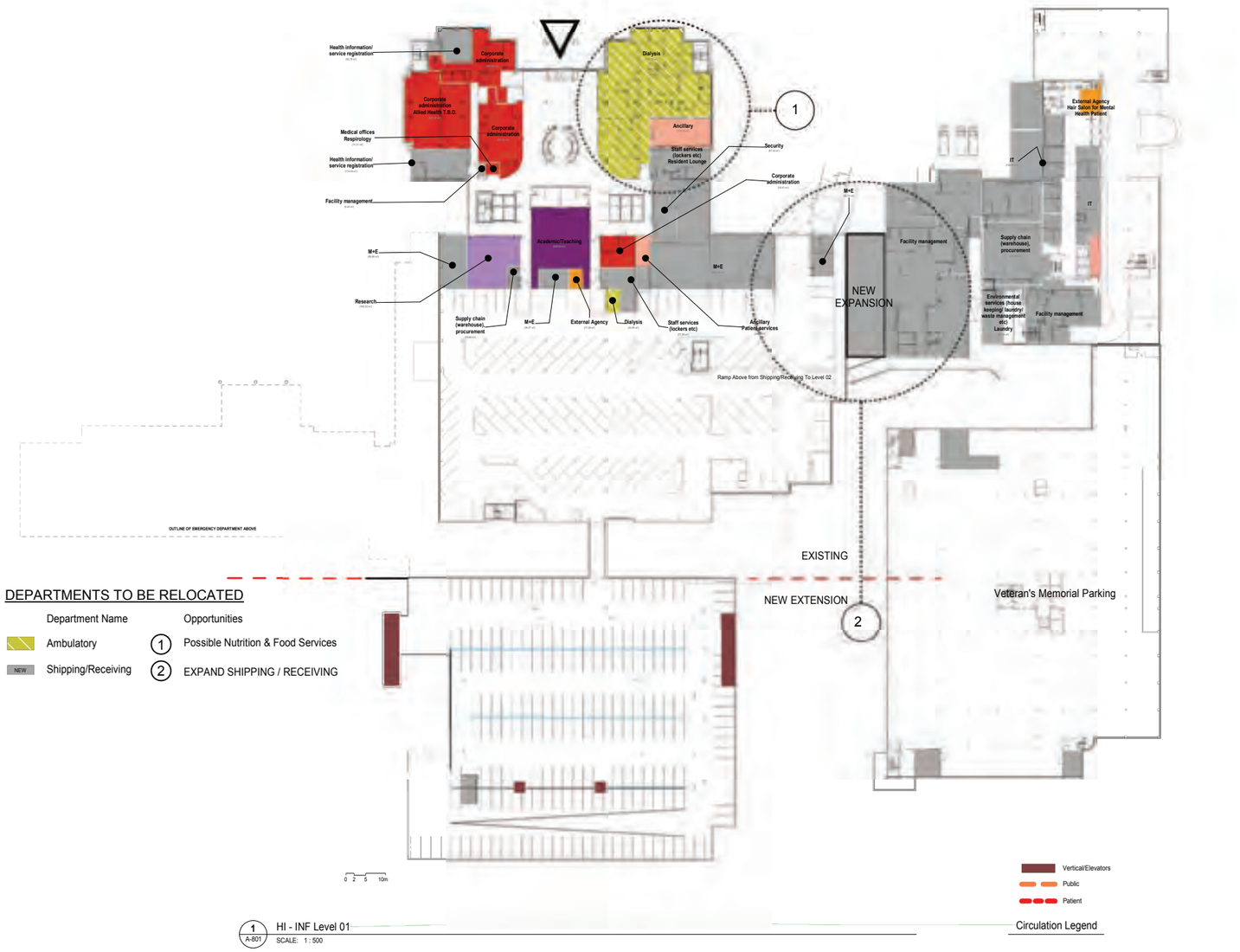
2 A-801 3D New Inpatient Level 01
SCALE:

Work-in-Progress Summary of Departmental Gross Area (D.G.S.F.) - New Inpatient Block Only

Departments	Programmed	Designed
Research and Learning	5,230 SF	5,887 SF
MDR	2,130 SF	2,158 SF
Retail +Public	51,500 SF	34,926 SF (Retail) + 22,060 SF (Public)
Nutrition & Food	12,600 SF	Part of Lobby
M + E	N / A	19,607 SF
OR	46,395 SF	53,111 SF
ICU	50,610 SF	45,314 SF
Inpatient Units	135,000 SF	154,572 SF
Total	303,465 SF	337,635 SF

DEPARTMENTS TO BE RELOCATED

Department Name	Opportunities
Ambulatory	1 Possible Nutrition & Food Services
NEW Shipping/Receiving	2 EXPAND SHIPPING / RECEIVING



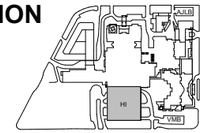
1 A-801 HI - INF Level 01
SCALE: 1 : 500

Fig. 656 HI Level 01

6.6 Opportunities & Constraints With Existing Hospital

6.6.2. HI Level 02

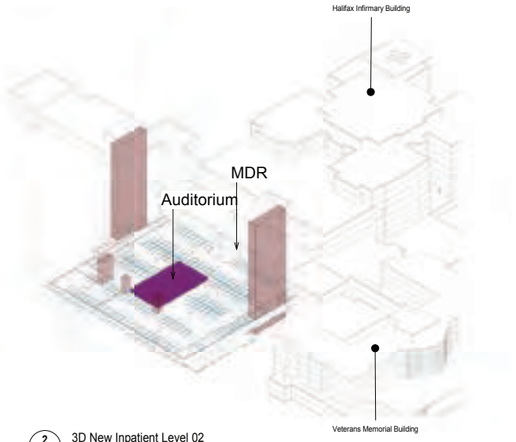
WILLOW TREE OPTION



KEY PLAN- HALIFAX INFIRMARY SITE

00-Department Gross Area - NEW INPATIENT EXTENSION - Level 02

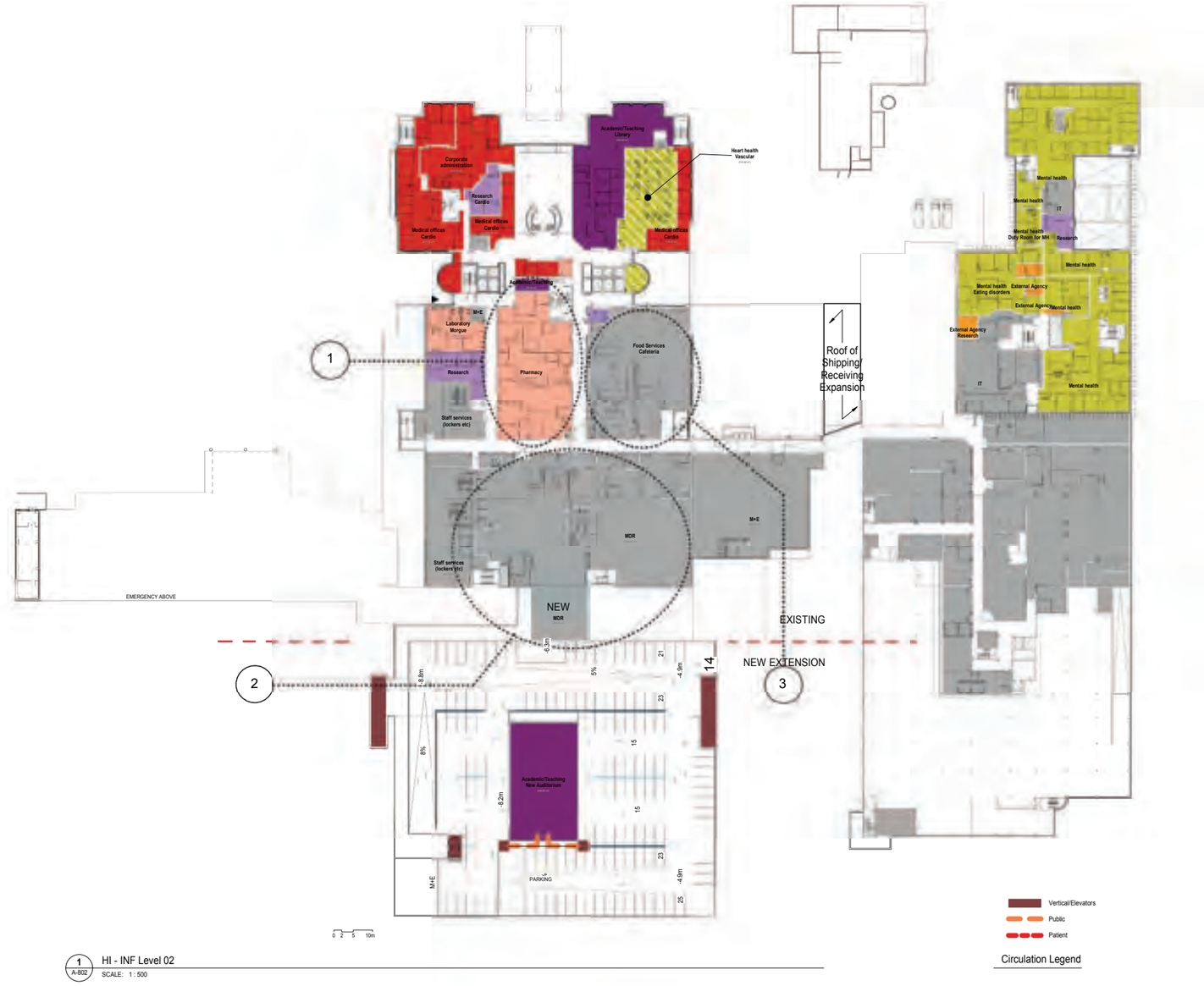
Type Image	Department Name	Area
	Academic/Teaching	5887 SF
		5887 SF
	MDR	2158 SF
		2158 SF
Grand total		8046 SF



2 A-802 3D New Inpatient Level 02
SCALE:

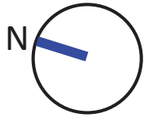
DEPARTMENTS TO BE RELOCATED

	Department Name	Opportunities
	Ambulatory	
	Pharmacy	1 EXPANSION OF PHARMACY
NEW	MDR	2 MDR EXPANSION IS REVISED ADJACENT TO EXISTING FUNCTION. MDR EXPANSION MUST SERVICE NEW OR EXPANSION; RENOVATION REQUIRED PHASED
	Nutrition & Food	3 FOOD COURT MOVED - TO BE DISCUSSED



1 A-802 HI - INF Level 02
SCALE: 1 : 500

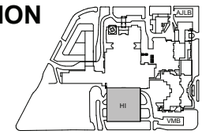
Fig. 657 HI Level 02



6.6 Opportunities & Constraints With Existing Hospital

6.6.3. HI Level 03

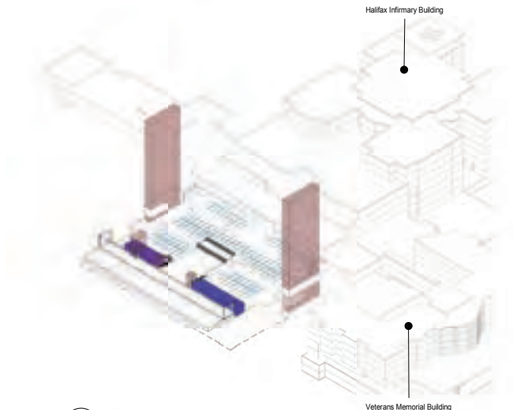
WILLOW TREE OPTION



KEY PLAN- HALIFAX INFIRMARY SITE

00-Department Gross Area - NEW INPATIENT EXTENSION - Level 03

Type Image	Department Name	Area
	Parking	35510 SF
		35510 SF
	Public	10196 SF
		10196 SF
	Retail	2847 SF
		2847 SF
Grand total		48552 SF



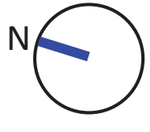
2 A-803 3D New Inpatient Level 03
SCALE:

DEPARTMENTS TO BE RELOCATED

Department Name	Opportunities
M + E	
Ambulatory	1 HEART HEALTH • RELOCATED TO AMBULATORY CARE BUILDING • THE SPACE TO BE UTILIZED FOR INPATIENT UNITS

Vertical/Elevators
Public
Patient

Circulation Legend



1 A-803 HI - INF Level 03 Site Plan
SCALE: 1 : 500

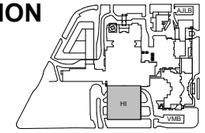
Fig. 658 HI Level 03

kasian

6.6 Opportunities & Constraints With Existing Hospital

6.6.4. HI Level 04

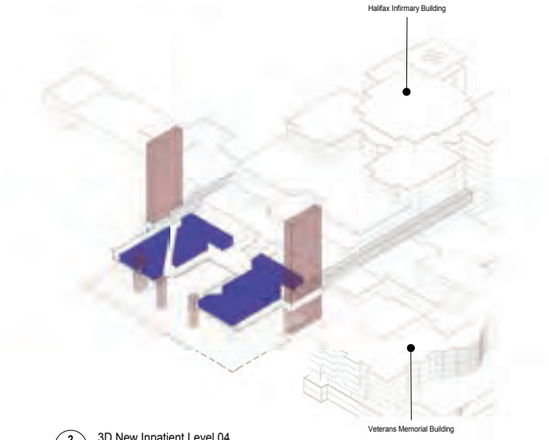
WILLOW TREE OPTION



KEY PLAN- HALIFAX INFIRMARY SITE

00-Department Gross Area - NEW INPATIENT EXTENSION - Level 04

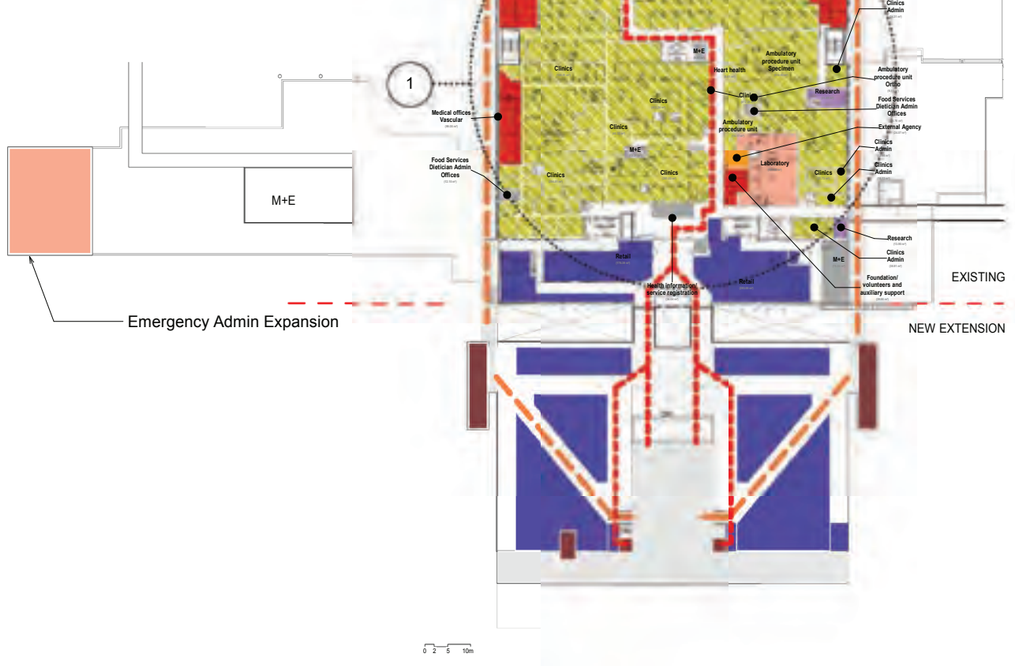
Type Image	Department Name	Area
	Retail	32080 SF
Grand total		32080 SF
		32080 SF



2 A-804 3D New Inpatient Level 04
SCALE:

DEPARTMENTS TO BE RELOCATED

Department Name	Opportunities
Ambulatory	1 ALL CLINICS TO MOVE TO NEW AMBULATORY CARE BUILDING; OPTION FOR ADMIN, EDUCATION AND RESEARCH RELOCATION



1 A-804 HI - INF Level 04
SCALE: 1 : 500

Vertical/Elevators
Public
Patient
Circulation Legend

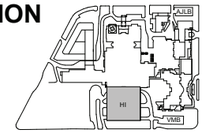
N

Fig. 659 HI Level 04

6.6 Opportunities & Constraints With Existing Hospital

6.6.5. HI Level 05

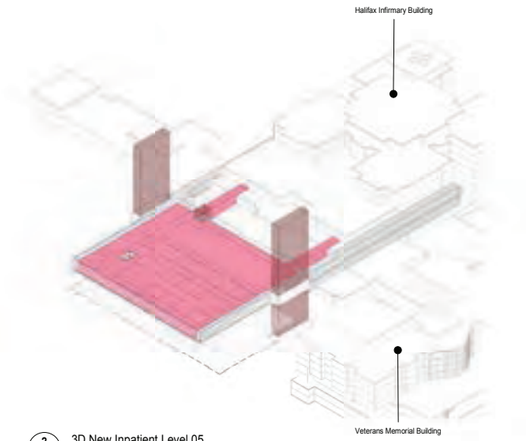
WILLOW TREE OPTION



KEY PLAN- HALIFAX INFIRMARY SITE

00-Department Gross Area - NEW INPATIENT EXTENSION - Level 05

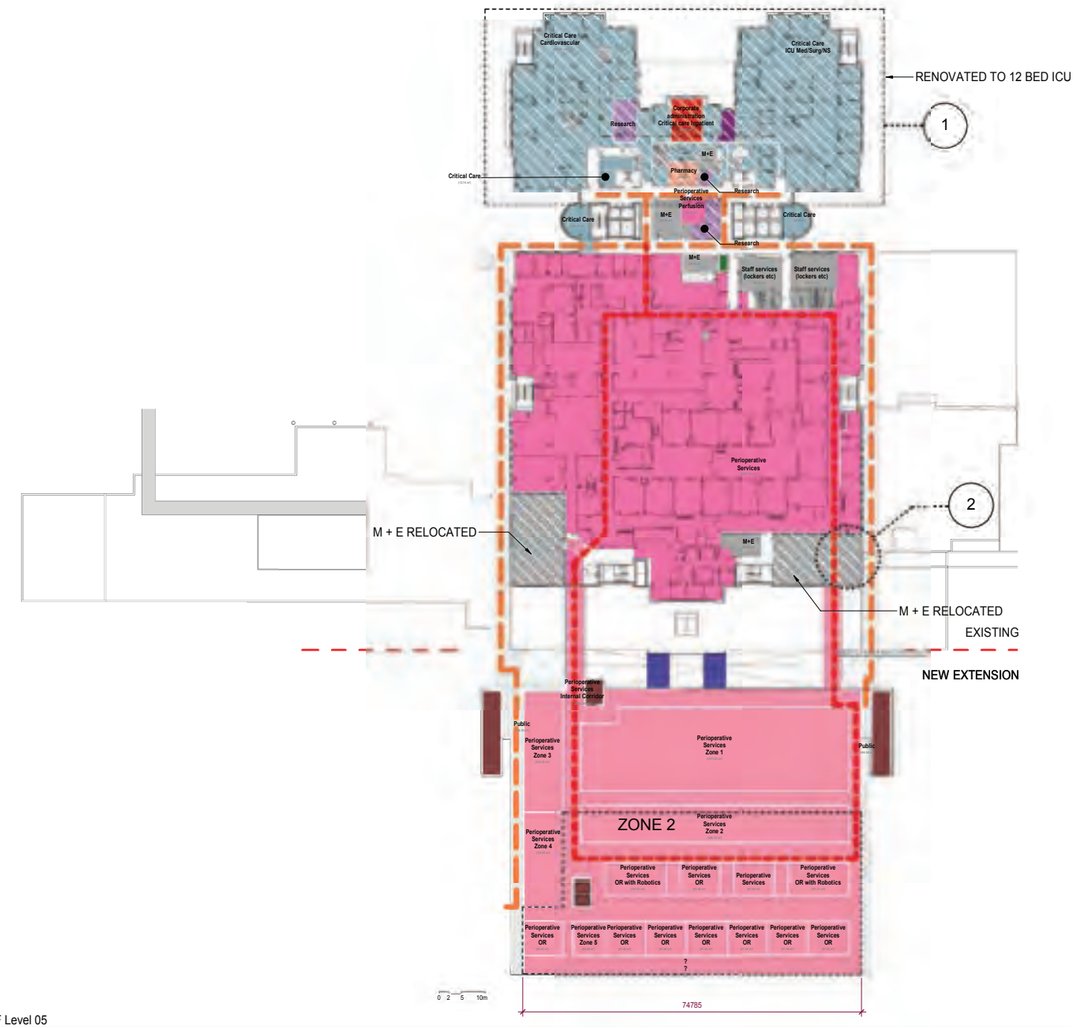
Type Image	Department Name	Area
	Perioperative Services	53112 SF
		53112 SF
	Public	20161 SF
		20161 SF
Grand total		73273 SF



2 A-805 3D New Inpatient Level 05
SCALE:

DEPARTMENTS TO BE RELOCATED

Department Name	Opportunities
Administration	
Research	
Academic & Teaching	
Inpatient Units	(1) RENOVATED TO 12 BED ICU
M + E	(2) SATELLITE BIO MED ENGINEERING WORKSHOP



1 A-805 HI - INF Level 05
SCALE: 1 : 500

Vertical/Elevators
Public
Patient
Circulation Legend

N

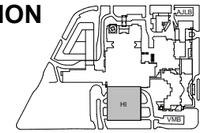
Fig. 660 HI Level 05

kasian

6.6 Opportunities & Constraints With Existing Hospital

6.6.6. HI Level 06

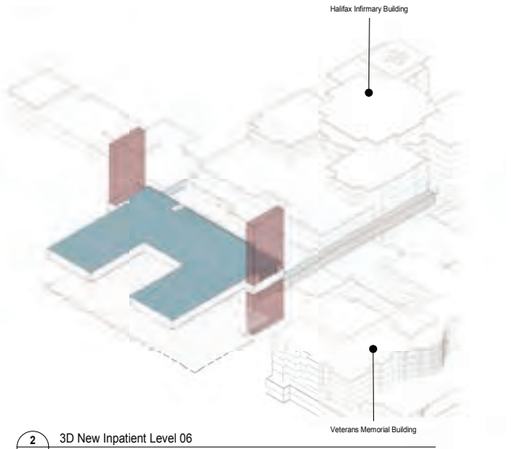
WILLOW TREE OPTION



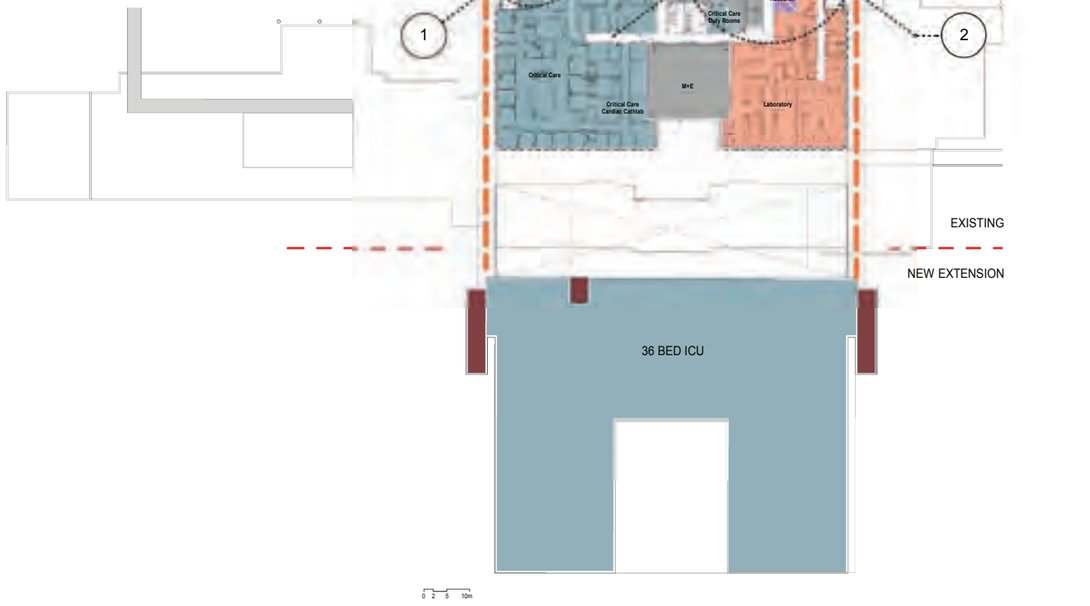
KEY PLAN- HALIFAX INFIRMARY SITE

00-Department Gross Area - NEW INPATIENT EXTENSION - Level 06

Type Image	Department Name	Area
	Critical Care	45315 SF
Grand total		45315 SF 45315 SF



2 A-806 3D New Inpatient Level 06
SCALE:



1 A-806 HI - INF Level 06
SCALE: 1 : 500

DEPARTMENTS TO BE RELOCATED

Department Name	Opportunities
Administration	1 CATHLAB CAN BE EXPANDED TO THE LOCATION
	2 BIO MED ENGINEERING TO BE EXPANDED - T.B.D.

Vertical/Elevators
Public
Patient

Circulation Legend

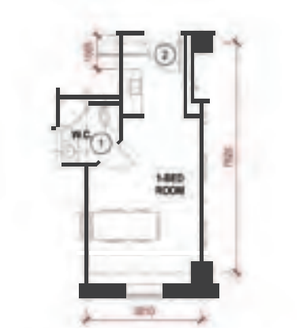
N

Fig. 661 HI Level 06

6.6 Opportunities & Constraints With Existing Hospital

6.6.7. Inpatient Unit Concepts

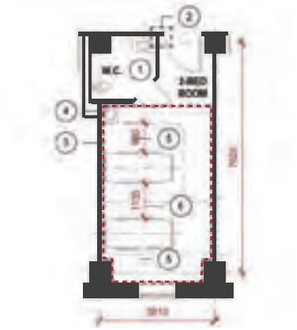
Existing Inpatient Rooms



Typical 1- Bed Room

① Washroom does not meet current space and accessibility requirements.

② Minimum dimension at front approach without obstructions at door into bedroom not met. (min. 1500mm)



Typical 2- Bed Room

① Washroom does not meet current space standards and accessibility requirements. There is no shower in WR.

② Entrance to room does not meet accessibility standards.

③ Bed area does not meet current space standards.

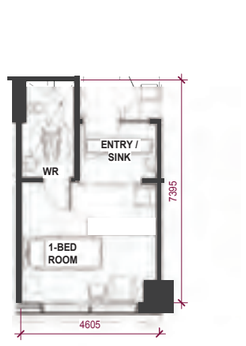
④ Handwashing sink not in ideal location.

⑤ Minimum distance between bed and non-transfer/ fixed surface not met.

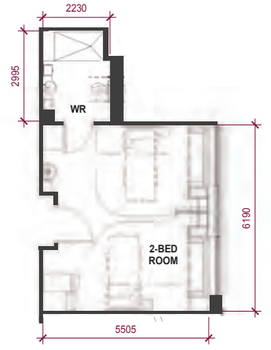
⑥ Minimum distance between beds not met.

Bedroom Sizes	Existing (sf)	Current Standards (sf)
1- Bed Room		
Bedroom	259	230
WR	38	60
2- Bed Room		
Bedroom	277	385
WR	38	60
1- Bed Room (Bariatric)		
Bedroom	-	235
WR	-	75

Sample Room Types (Current Standards)

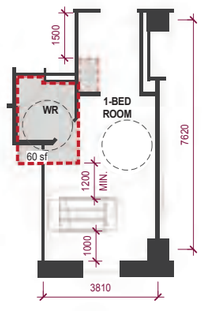


Typical 1- Bed Room

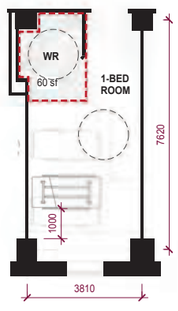


Typical 2- Bed Room

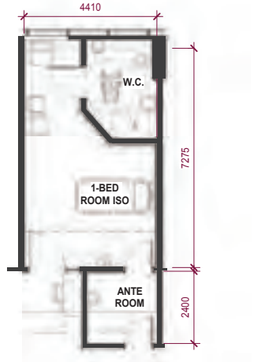
Upgrades to Meet Current Standards



Renovate washroom to meet current space and accessibility standards.



Convert 2-bed rooms into 1-bed room, and renovate washroom to meet current space and accessibility standards.



Typical Bed Room - ISO

Fig. 662 Inpatient Room Concepts

Inpatient Room Analysis - 2017.05.10

kasian

6.6 Opportunities & Constraints With Existing Hospital

6.6.8. Inpatient Unit Concepts

Inpatient Room Counts

Halifax Infirmary Level 7

Current Bed Count:

Bed room type	No. of Rooms	No. of Beds	
1-Bed Room	4	4	(27%)
2-Bed Room	16	16	(53%)
3-Bed Room	6	6	(13%)
4-Bed Room	4	4	(7%)
15 rooms		30 beds total	

Preliminary Inpatient Unit Concepts

1- Bed Room

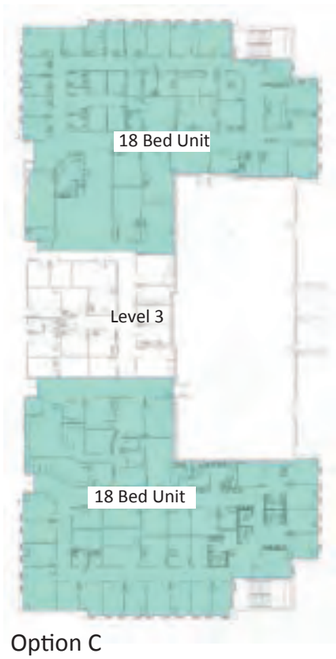
2- Bed Room

Option A

12 x 1-Bed Rooms	12 beds (80%)
3 x 2-Bed Rooms	6 beds (20%)
Total:	18 beds

Option B

6 x 1-Bed Rooms	6 beds (40%)
9 x 2-Bed Rooms	18 beds (60%)
Total:	24 beds



Option C

Renovation of Level 3 HI to accommodate 80% 1-bed rooms and 20% 2- bed rooms.

Number of Inpatient Beds in HI: 336		
Option A:	Option B:	Option C:
• 10 units of 18 = 180 beds • Additional 156 new beds required	• 10 units of 24 = 240 beds • Additional 96 new beds required	• Existing bed capacity in HI to remain unchanged • Renovation of Level 3 HI to accommodate 80% 1-bed room and 20% 2-bed room to create 2 units of 36.

Fig. 663 Inpatient Unit Concepts

Inpatient Unit Analysis - 2017.05.10

6.6 Opportunities & Constraints With Existing Hospital

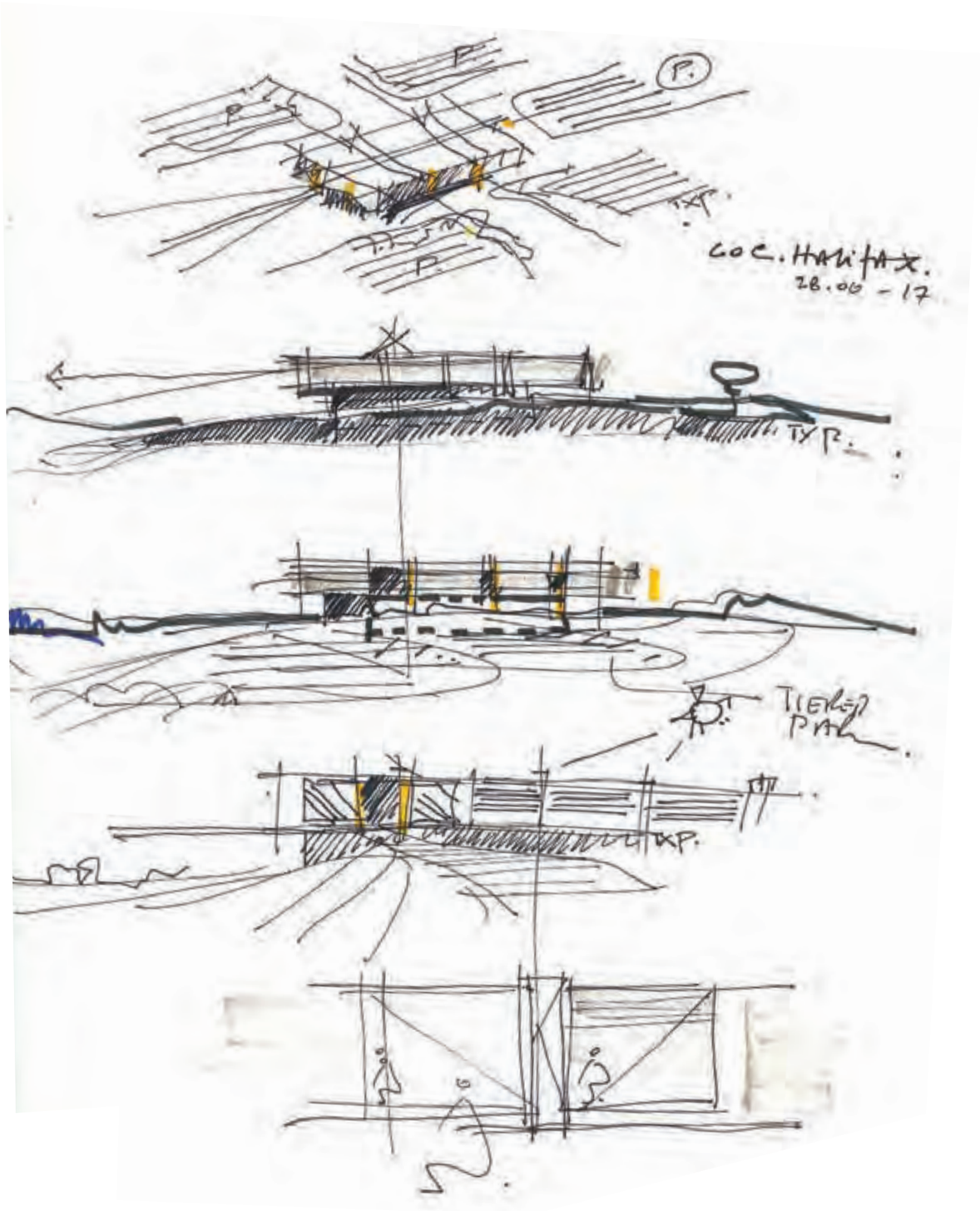


Fig. 664 Community Outpatient Centre Sketches

6.7
Community Outpatient Centre

6.7 Community Outpatient Centre

Community Outpatient Clinic - Bayers Lake

The Community Outpatient Clinic will be built on vacant land in the Halifax Bayers Lake retail park. The suburban medical facility will provide several services currently only offered in downtown Halifax. The components within the clinic will include:

- Collaborative Health Care Team;
- Diagnostic Services;
- Dialysis/Renal Services;
- Geriatric Services;
- Interdisciplinary Services;
- Mental Health and Wellness;
- Rehabilitation;
- Public Space; and
- Administration and Support Services.

The Facility will be designed as a **community destination** for visitors with a **distinctive identity and welcoming atmosphere**. It will respond to the role the environment; nature and community play in the delivery of healthcare.

The facility will set a benchmark with its **stress reduction and healing environment**. Visitors will be provided the restorative benefits of natural light, views of nature, and access to the surrounding landscape.

Intuitive wayfinding will be emphasized in this design, allowing for visitors to easily and directly access their destination.

Built-in flexibility for growth and change is a key driver and generator of the concept. A flexible and modular building typology will be developed allowing for future expansion and growth as healthcare demands and demographics change.

The Community Outpatient Clinic will **be an example of environmental sustainability, minimize impact on the geological and topological footprint**. It will incorporate minimum storm water management infrastructure by respecting the site typology.

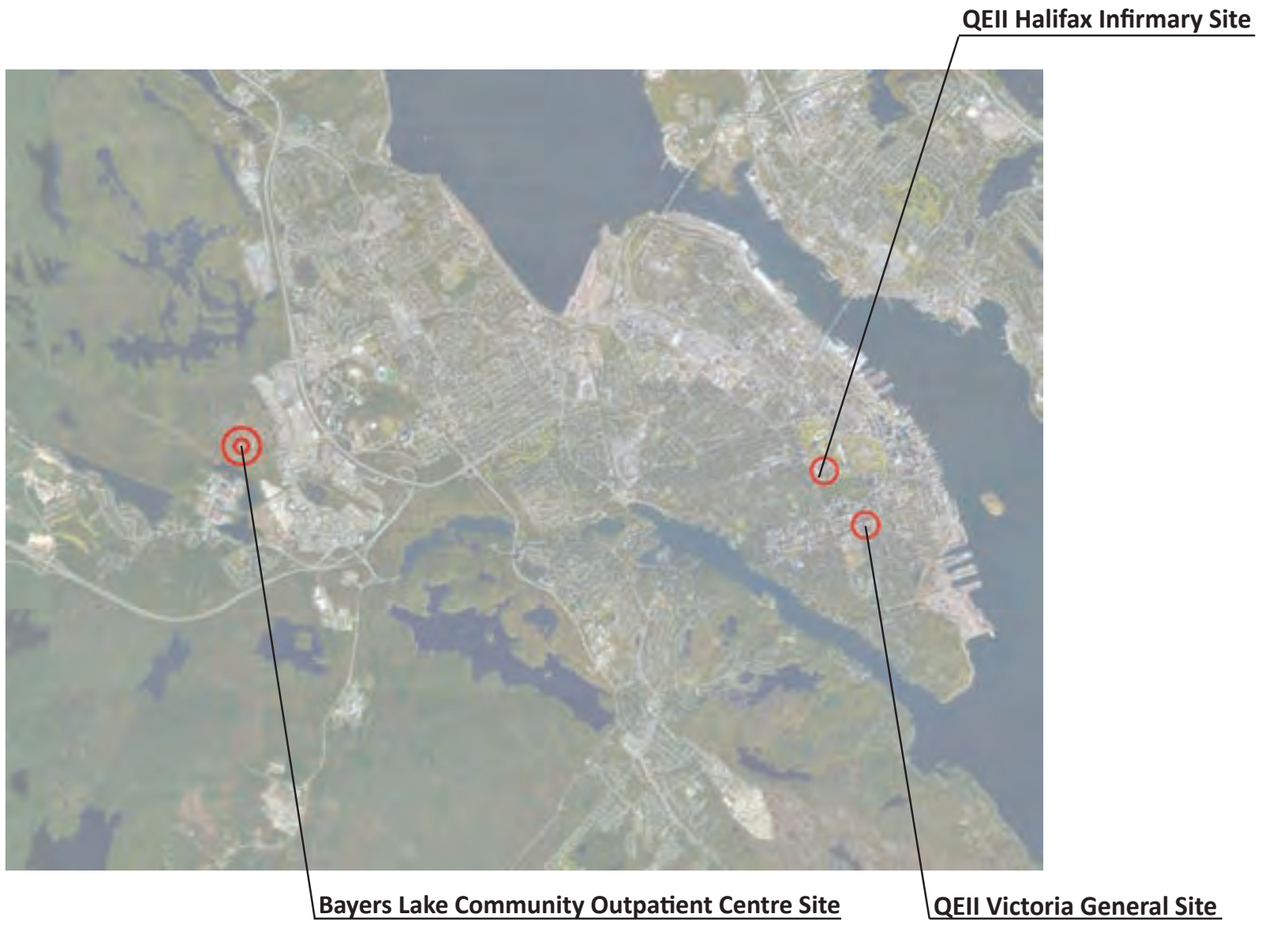


Fig. 665 Key Map

6.7 Community Outpatient Centre

Fig. 666 Bayers Lake Aerial View

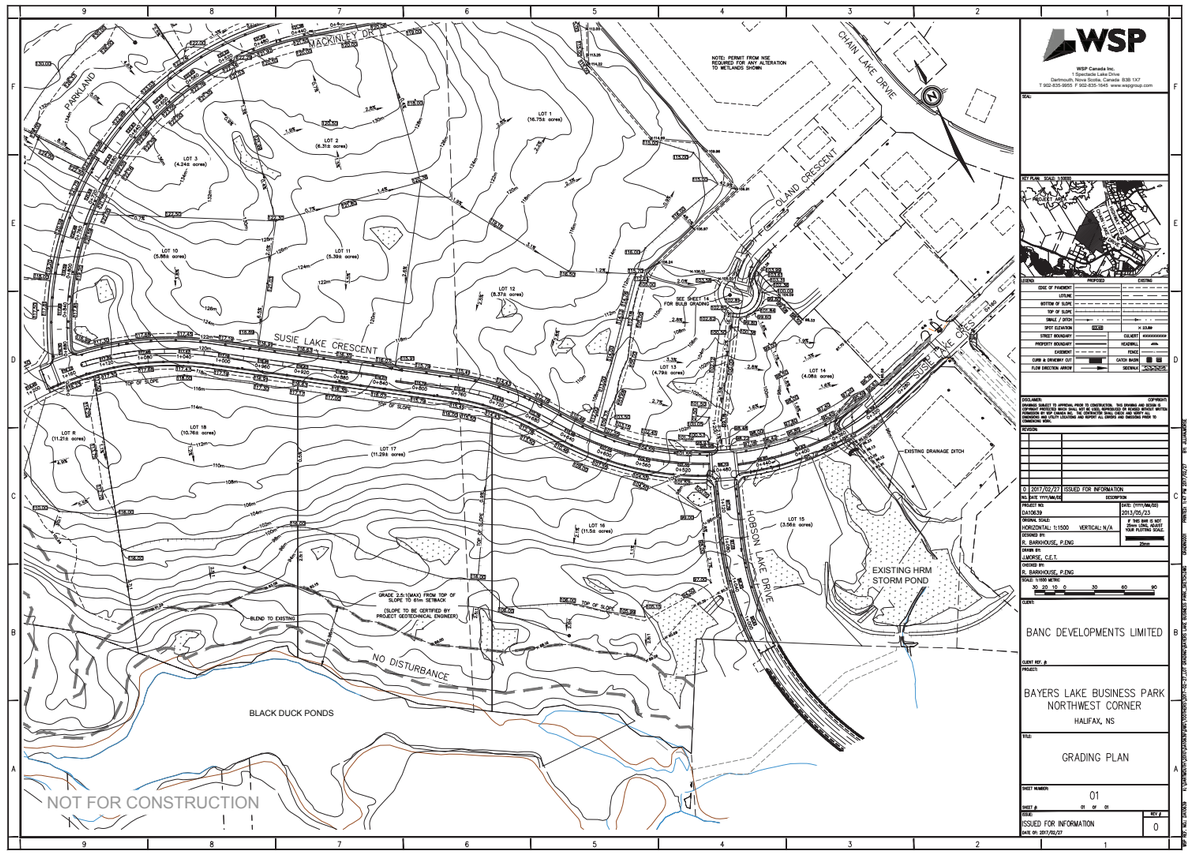


Fig. 667 Grading Plan

N

6.7 Community Outpatient Centre

6.7.1. Precedents

Massing/Blocking

Pole Sante Dal de Cher Health Centre / Selles-sur-Cher, France /
OLGO

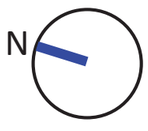
CircleBath hospital / Bath, UK /
Foster + Partners

CircleBath hospital / Bath, UK /
Foster + Partners

BOBST Headquarters / Chemin De Faraz, Switzerland /
Richter Dahl Rocha & Associes

Ha-Emek Medical Centre / Ha-Emek, Istael /
Ron Arad

John Fry Sports Park Pavilion / Edmonton, Canada /
The Marc Boutin Architectural Collaborative Inc.



6.7 Community Outpatient Centre

6.7.1. Precedents

Halifax / Environmental Context

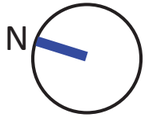
Long Studio / Fogo Island, Newfoundland, Canada /
Saunders Architecture

Long Studio / Fogo Island, Newfoundland, Canada /
Saunders Architecture

'Abstract and Hard" Care Home / Valladolid, Spain /
Oscar Miguel Ares Alvares

Orillia Multi-Use Recreation Centre / Orillia, Canada /
MJMA

'Abstract and Hard" Care Home / Valladolid, Spain /
Oscar Miguel Ares Alvares



6.7 Community Outpatient Centre

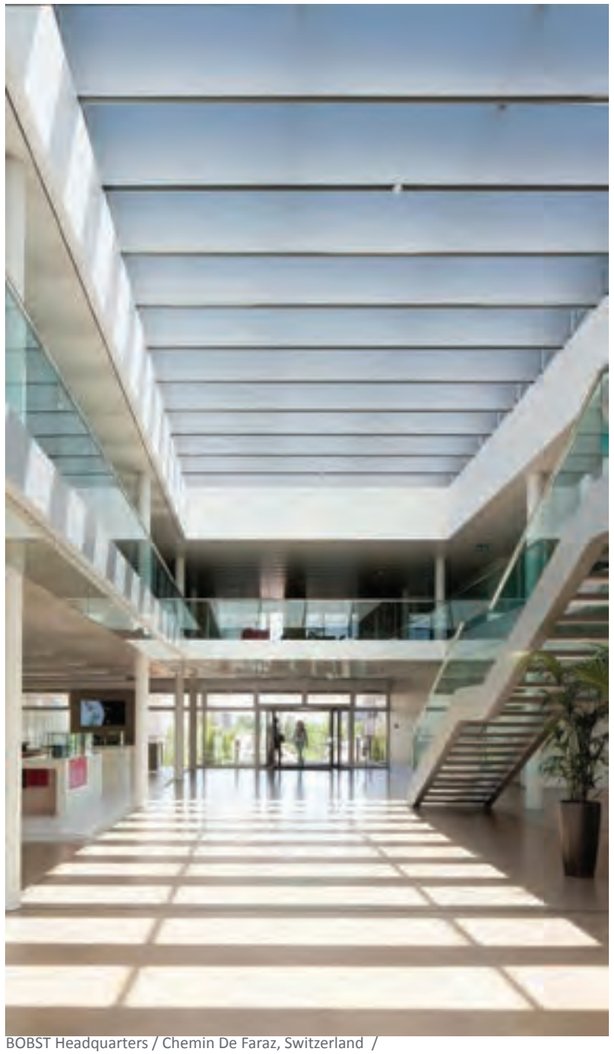
6.7.1. Precedents

Wayfinding and Light

Dommartin-les-Toul Epilepsy Care Home / Dommartin-lew-Toul, France /
Atelier Martel

'Abstract and Hard" Care Home / Valladolid, Spain /
Oscar Miguel Ares Alvares

Seijo Koshita Hospital/ Tokyo, Japan /
Kengo Kuma + Associates



BOBST Headquarters / Chemin De Faraz, Switzerland /
Richter Dahl Rocha & Associes

Ospital Pacifica de Juan and Juana Angara/ Philippines /
CAZA

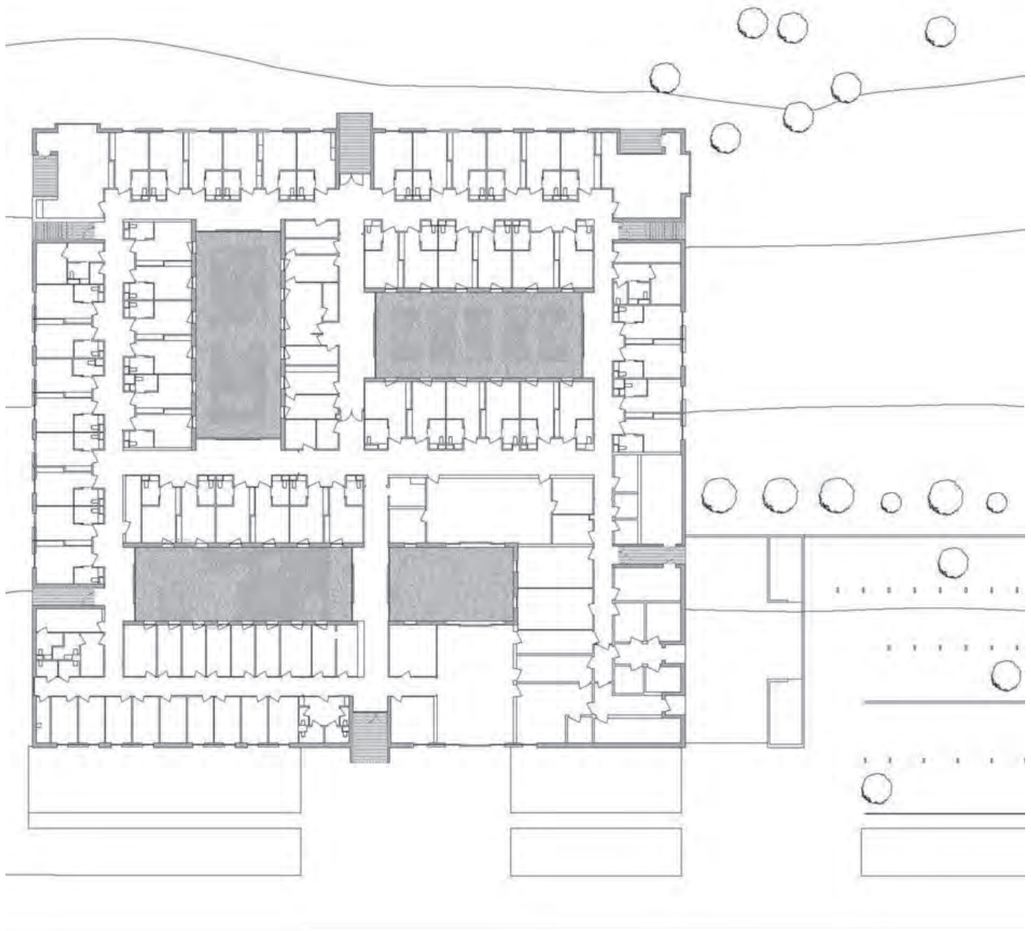
Dommartin-les-Toul Epilepsy Care Home / Dommartin-lew-Toul, France /
Atelier Martel

De Bouwmeester - Nursery, Health, Aging Facility / Utrecht, the Netherlands /
LEVS Architecten

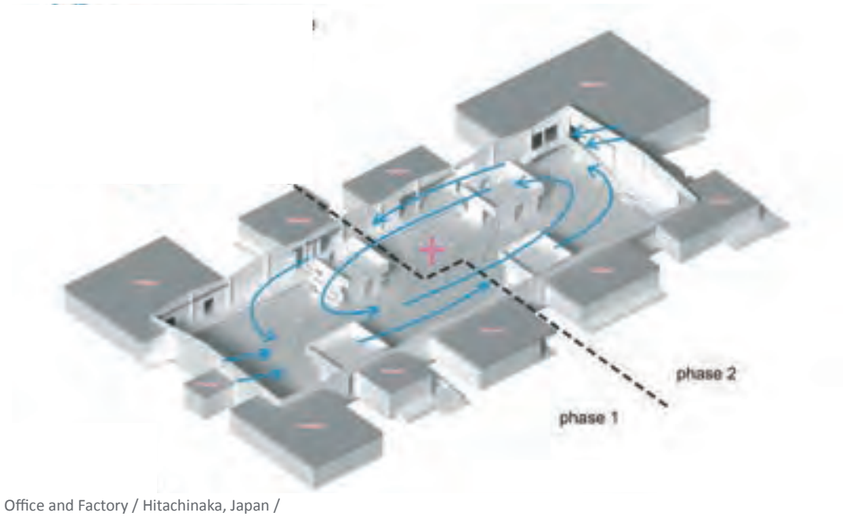
6.7 Community Outpatient Centre

6.7.1. Precedents

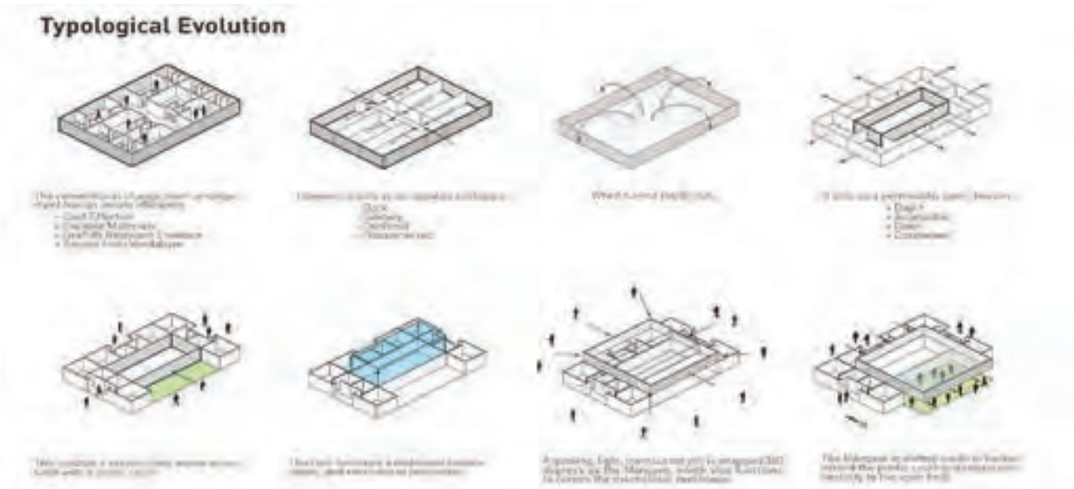
Grid / Layout



Dommartin-les-Toul Epilepsy Care Home / Dommartin-lew-Toul, France /
Atelier Martel



Corona Electric Head Office and Factory / Hitachinaka, Japan /
Sachie Isaka of bews + Yuji Tanabe Architects



John Fry Sports Park Pavilion / Edmonton, Canada

6.7 Community Outpatient Centre

Fig. 669 Community Outpatient Centre Rendering

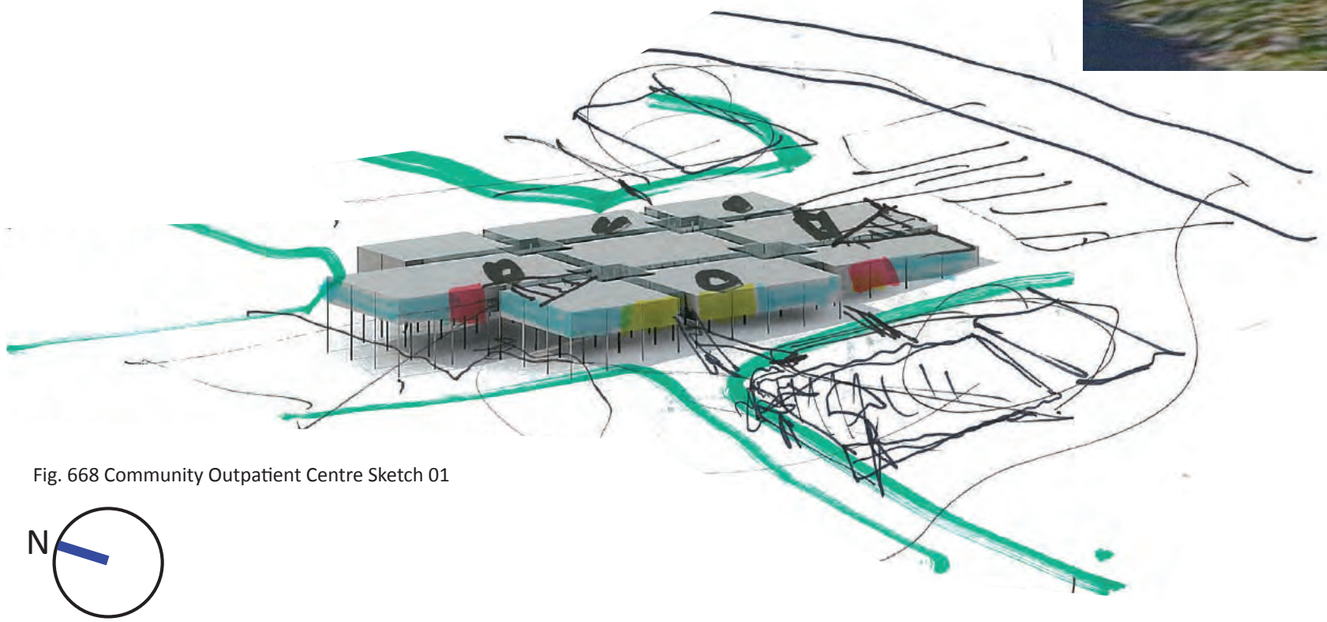


Fig. 668 Community Outpatient Centre Sketch 01

6.7 Community Outpatient Centre

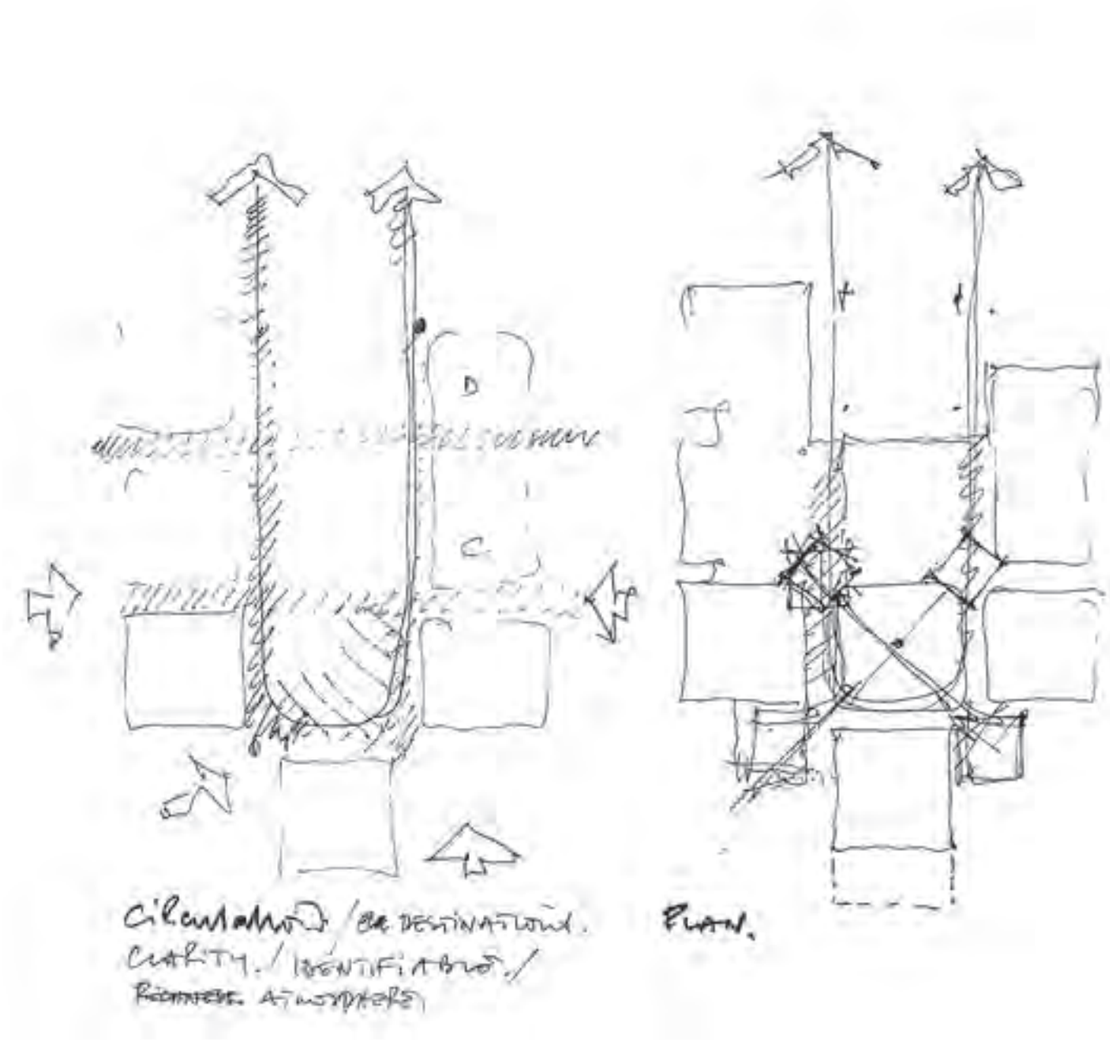


Fig. 670 Community Outpatient Centre Concept Sketch 02

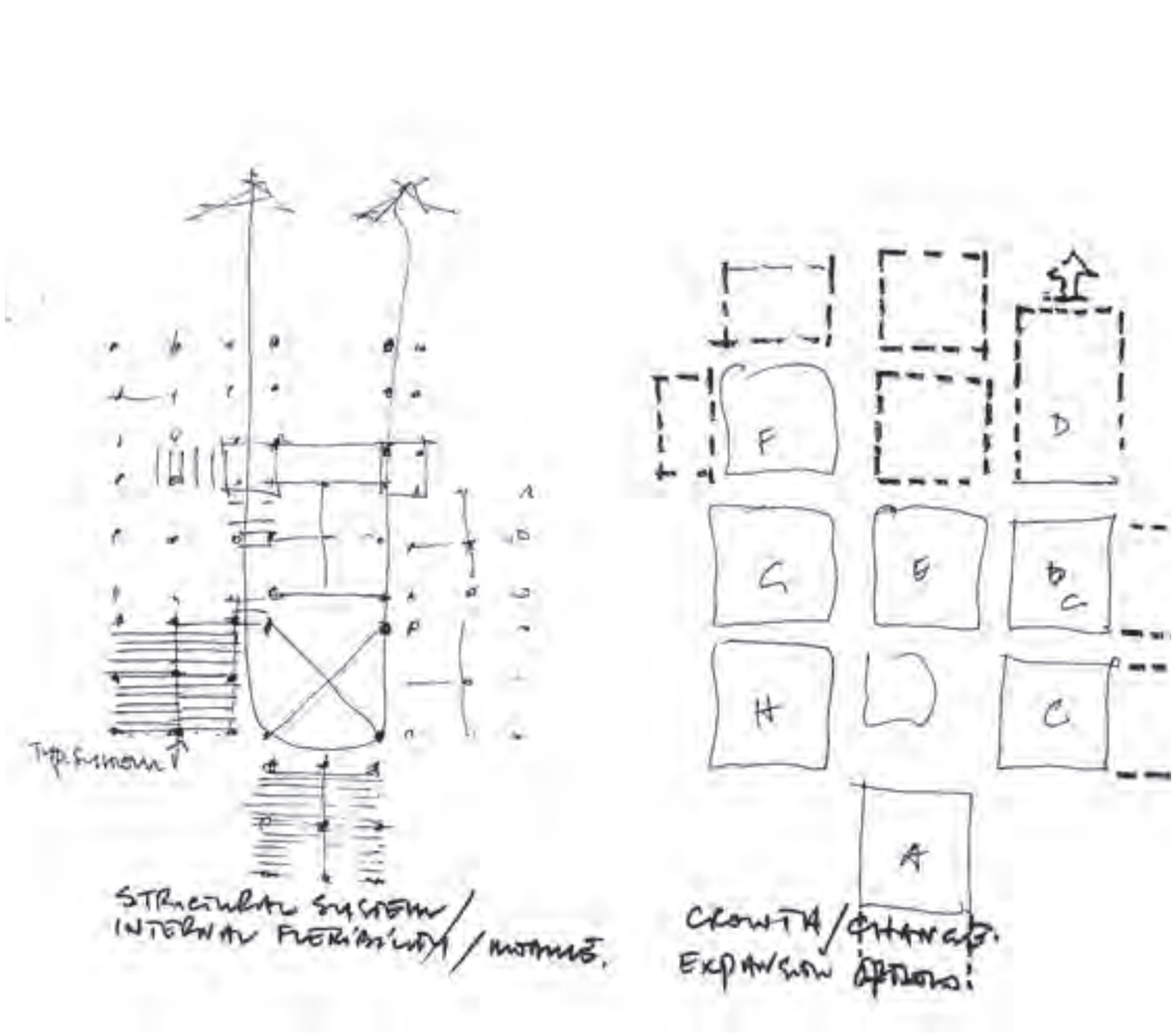


Fig. 671 Community Outpatient Centre Concept Sketch 03

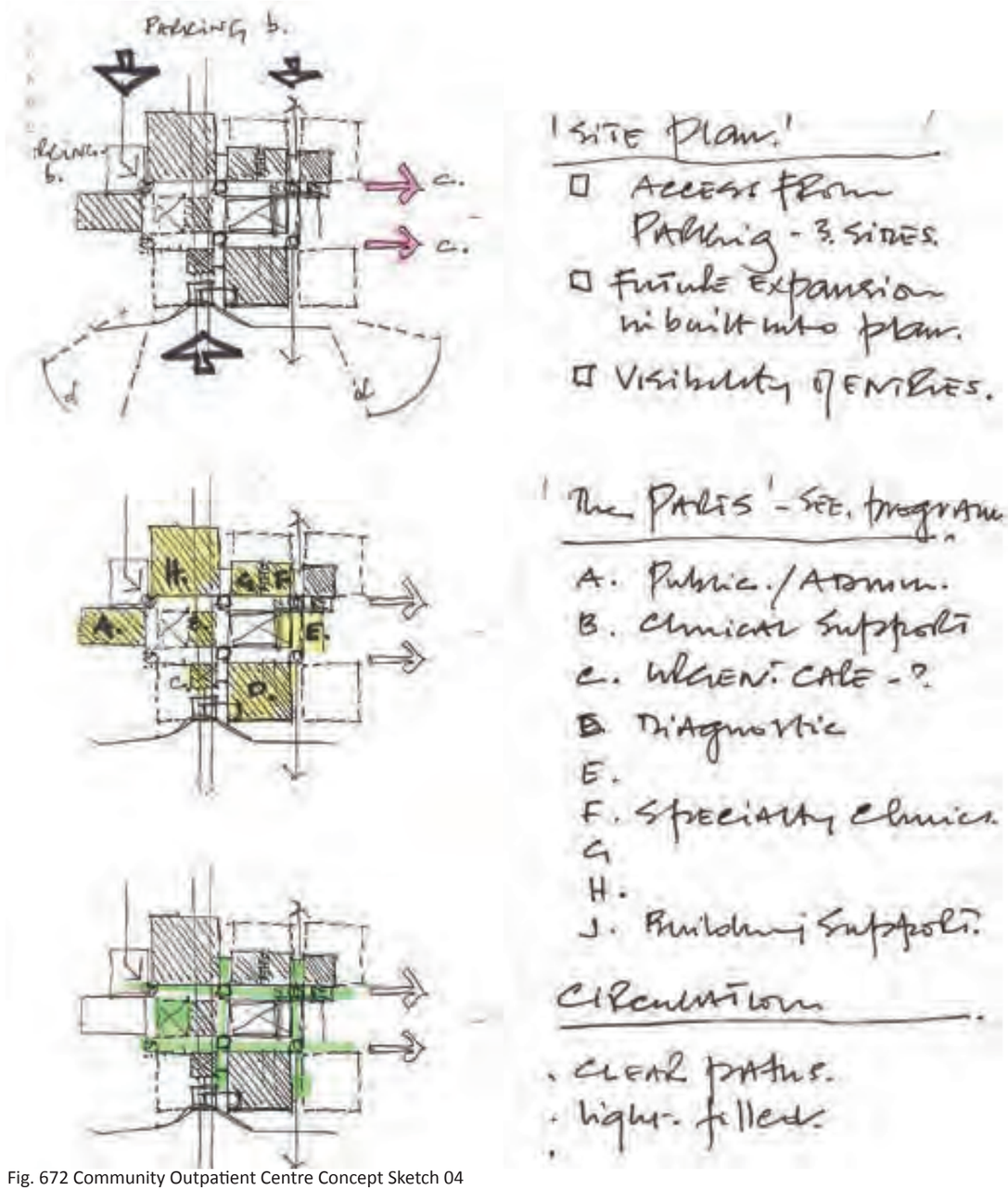


Fig. 672 Community Outpatient Centre Concept Sketch 04

6.7 Community Outpatient Centre

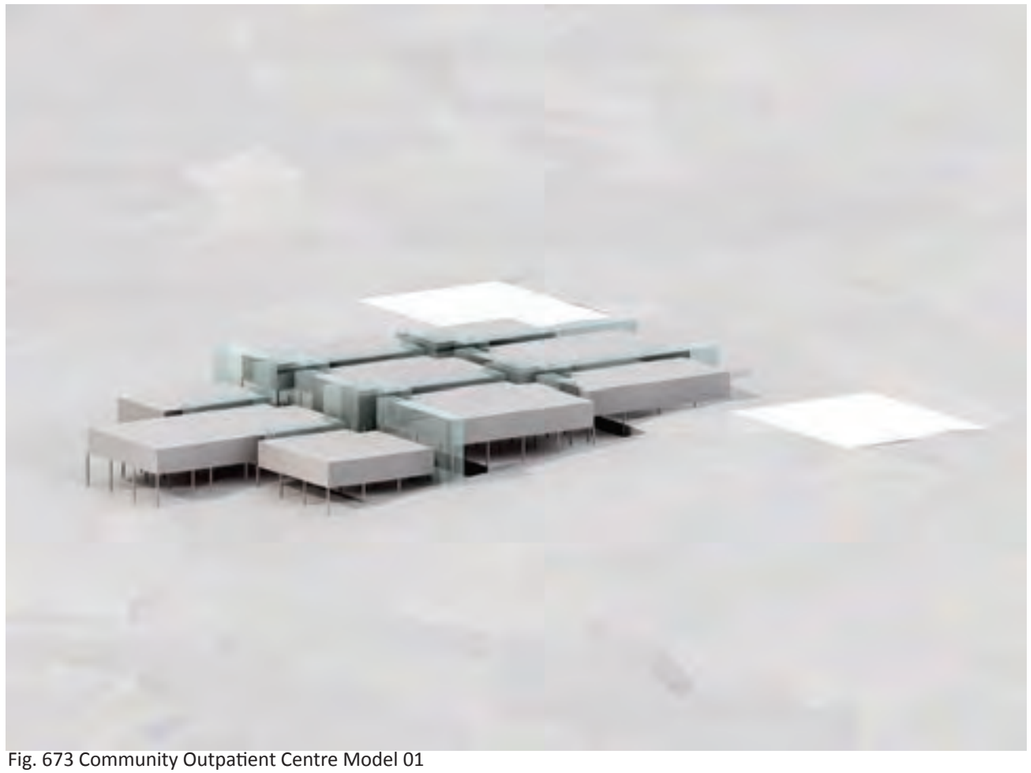


Fig. 673 Community Outpatient Centre Model 01

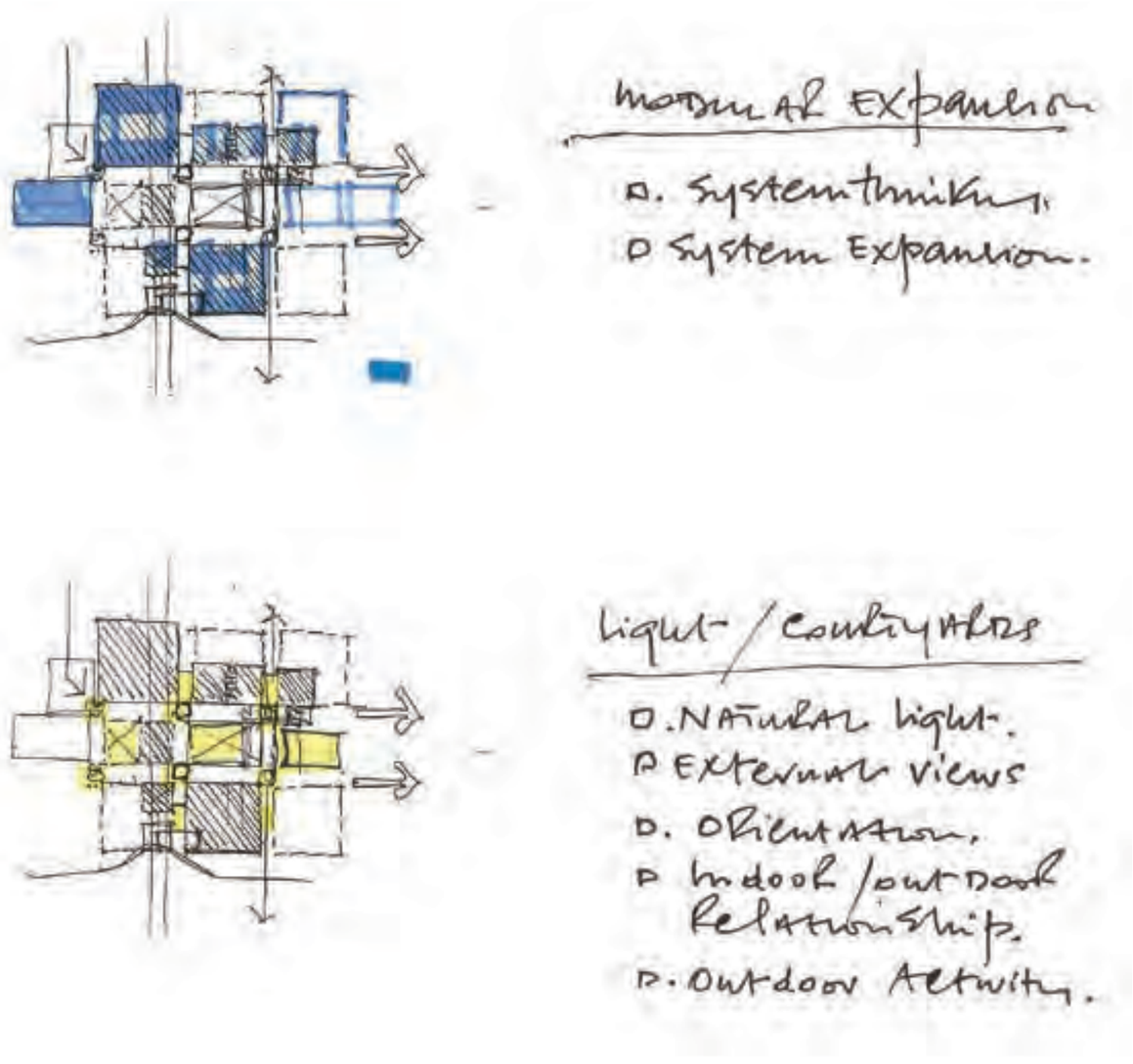


Fig. 674 Community Outpatient Centre Concept Sketch 05

Fig. 675 Community Outpatient Centre Model 02

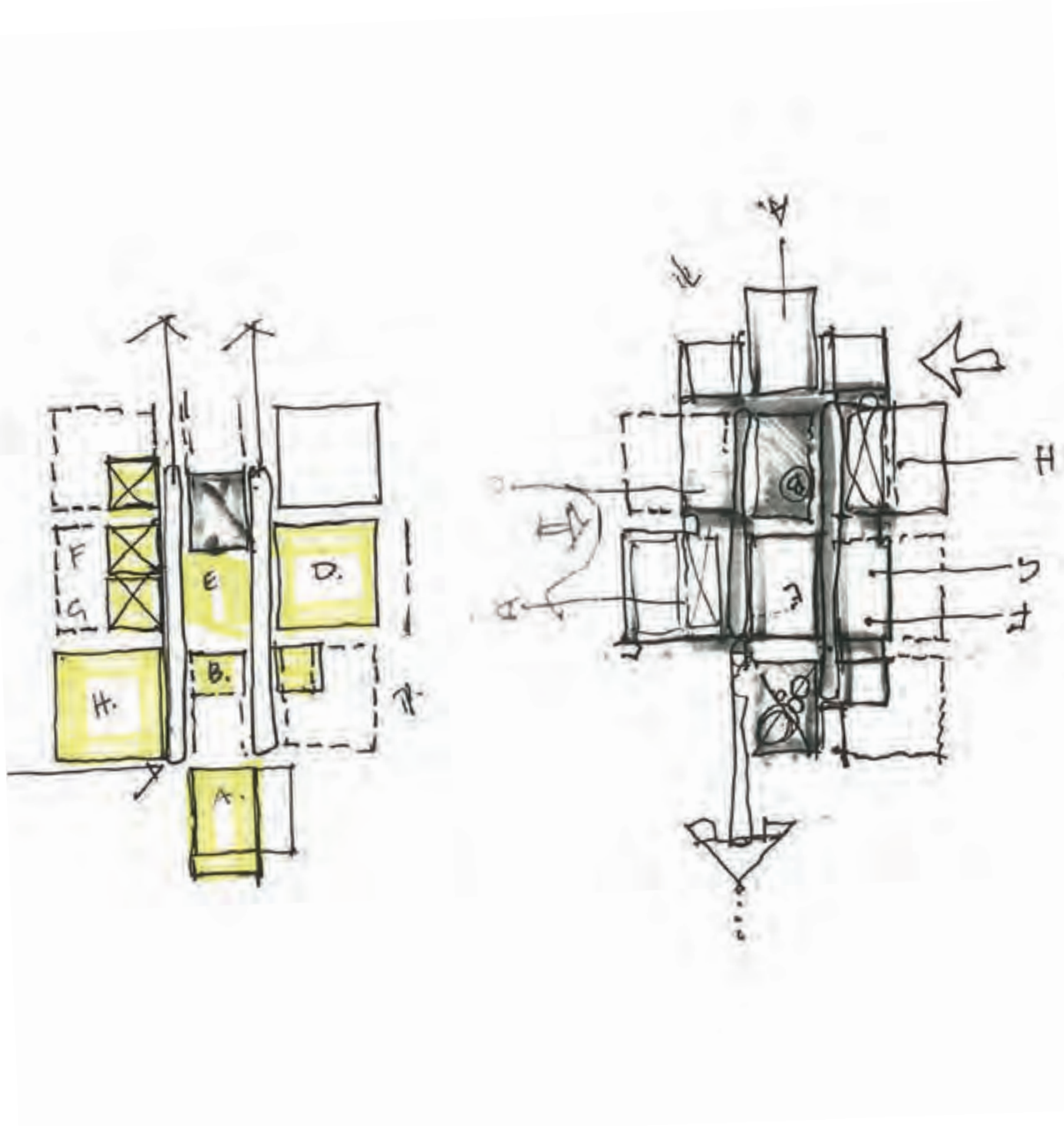


Fig. 676 Community Outpatient Centre Concept Sketch 06

N

8

Next Steps

8.1 Next Steps

DRAFT

July 11 2017

NEXT STEPS

Converging Explorations into Options

For the past few months, while functional programming was taking place, the Kasian team conducted "opportunities and constraints "workshops that concluded with a series of explorations on how the sites could be developed in the initial phase with a long-term view always in our sights.

"Solving the Rubik's cube" opportunities and explorations

The purpose of the "opportunities and explorations" sessions was to engage the teams in the exploration of the opportunities and constraints within the HI and VG sites. The intent is not to arrive prematurely at conclusions but to afford the opportunity for the team to laterally think of scenarios and to understand the broad implications and complexities when a decision is made. It was a "what if" open dialogue, highlighting the critical operational decisions and timelines and understanding the ripple effects of moves etc.

This interim report documents the work done to date and discussed at the various workshops.

The next steps will involve developing specific explorations and, with program information in hand, to engage in a discussion on the specific locations and adjacencies of major departments. The agenda is intentionally not highly structured; the process needs to allow creative thinking with the objective of moving into options.

Topics will include:

- The urban contextual influences
- Site transformation resulting from aging infrastructure within in a 10 / 15 / 20 / 30 year plus time frame following repurposing and / or demolition.
- Creating a growth strategy that reinforces operational efficiency at each phase.
- Decanting strategies, priorities and opportunities.
- Time frames for growth and change.
- Facility condition and infra structure implications.
- The location of major departments and adjacencies.
- Establishing a criteria for assessment of options.
- Precedents

Because the two sites are an integral part of a whole and one will influence the other the discussion on the two sites will overlap.

For the process of arriving at a rational decision on a selected option, Kasian will develop option D "the Willow Tree" for the workshop on the week of July 17 2017, and at subsequent workshops present the "Gateway Scheme".

In parallel we will jointly develop an evaluation matrix, obtain order of magnitude costing, present input from our Lean consultants and M&E team. Input from our traffic consultant will also be required for each option. Our evaluation will also include the scheme to construction over the existing emergency building in a matrix comparative. The evaluation matrix will be developed to compare the pros and cons of each option presented. The categories for the evaluation matrix have been developed with NSHA and DTIR and include:

- Reflects Strategic Directions, values and vision of NSHA
- Urban Design
- Patient Experience and Healing Environment
- Clinical Functionality at each phase and LEAN
- Creating a rational Growth Pattern and Allowing for Flexibility/ Growth/Change
- Phasing and Decanting
- Operational Efficiency
- Property Development Opportunities
- Technical Considerations
- Sustainability
- Constructability
- Impact on Parking
- Logistics, Internal & External site circulation
- Creative and Intuitive Wayfinding
- Optimize Cost Benefits
- Integration of Academic and Research
- Capitalize on Retail/ Commercial opportunities
- Disaster Planning
- Risk Factors
- Procurement Methodology

Joint visits to benchmark buildings will also be required as part of the process.

The evaluation matrix will include items that span from urban connectivity to phasing and decanting. The evaluation will need to be jointly concluded with NSHA and DTIR.


Kasian