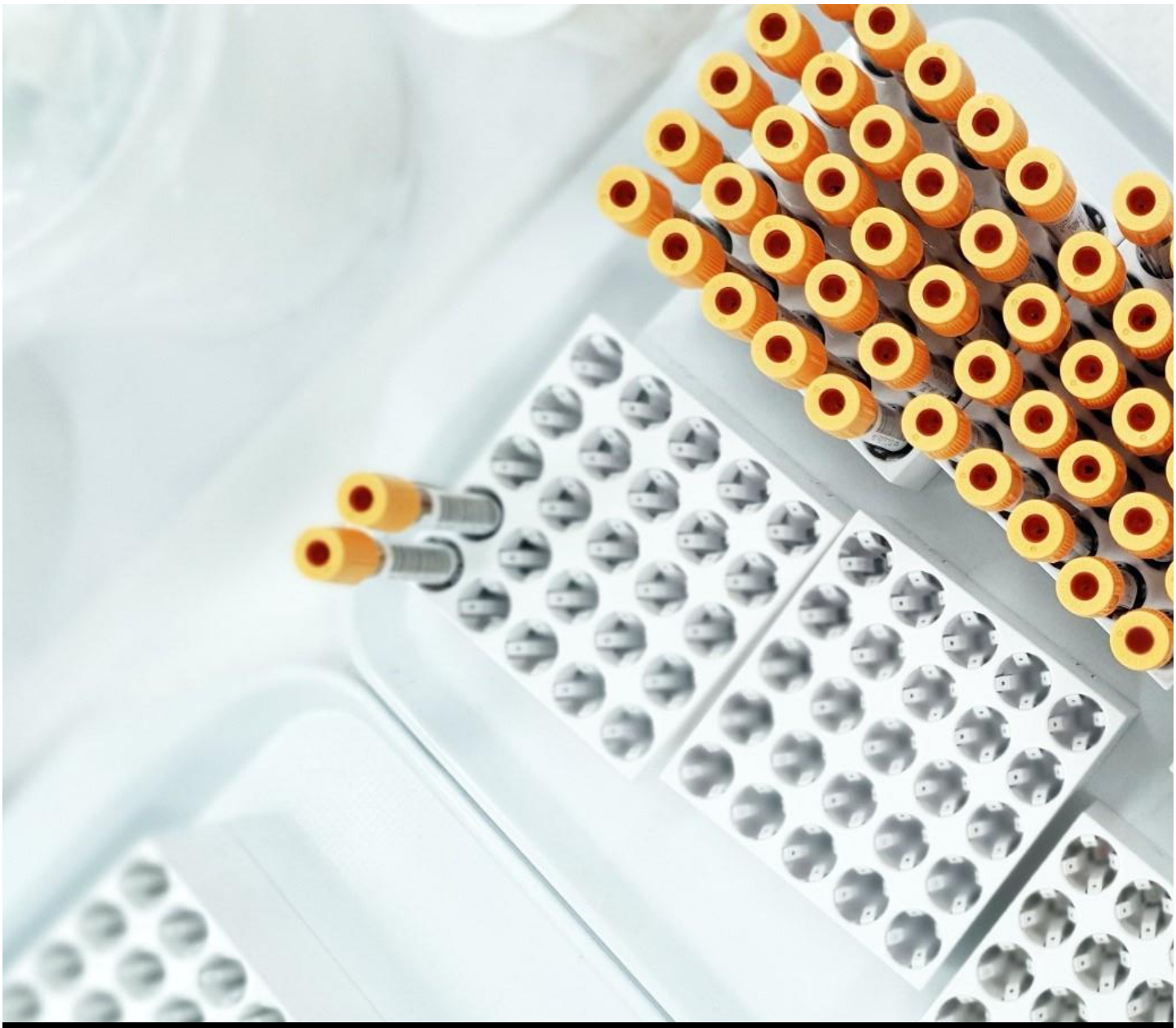

DESTRAVIS GROUP

New Dunedin Hospital

Project Options report for pathology department

Date June 2023

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1 INTRODUCTION

1.1 Purpose

Destravis was engaged by Te Whatu Ora Health New Zealand to was to advise on the minimum schedule of accommodation requirements for a stat laboratory, with the output of the review helping to inform the decisions relating to future role and function of pathology in the NDH.

In commencing the review process and considering key points provided from consultation with peer laboratories, it was determined the schedule of accommodation for a stat laboratory within the allocated space was unlikely to be achievable. The review progressed to an exploration of the options for the pathology department to support inpatient activity at the NDH. The options were refined and developed, they considered the local requirements, the critical functions of the pathology service and the known constraints, such as the proposed allocated department area. The review included jurisdictional analysis to identify whether there were comparable pathology departments in other jurisdictions and utilised this information to inform the options and recommendations.

This options report has been developed for the purposes of informing decisions on the preferred solution and to enable the Te Whatu Ora to assess the impact on the capital build, the project timelines and to commence subsequent planning.

1.2 Methodology

To undertake this engagement, scenarios and advice from peers in other jurisdictions were sought to assess the feasibility of the space allocated for pathology in the NDH and whether this would be sufficient to function as a stat laboratory. The peer jurisdiction consultation began with senior management of laboratories in Australia as this was thought to be the best approach to obtain an impartial view. Enquiries were made to ascertain whether there were stat laboratories operating to service public hospitals, and whether a stat laboratory within the NDH would adequately service the demand generated from inpatient clinical services.

The review process to inform option development has involved a mixed methods approach comprising of:

- review of documentation which included relevant project documents, internal working documents, policy and professional organisation publications, media releases and website content.
- stakeholder consultation occurred directly through structured and semi structured meetings or indirectly via email. Those consulted included members of the Project Working Group (PWG), the Clinical Transformation Group (CTG), Facilities Transformation Group, and the Clinical Reference Group (CRG).
- comparison of pathology departments and operating models in South Australia, Queensland and New Zealand based on publicly available information and consultation with senior management of the various organisations from each jurisdiction. This was undertaken to get peer advice on pathology service levels, critical testing, infrastructure, and requirements to support clinical services in hospitals.

Destravis acknowledges and is appreciative of all stakeholders who contributed to the assessment of the current state and the development and assessment of options for the pathology laboratory in NDH. The input and insight from aforementioned groups, and the jurisdictional pathology subject matter experts has been highly valuable to the development of options, the criteria to assess these against and identifying potential future solutions.

1.3 Context

Project overview

The New Dunedin Hospital (NDH) is predicted to be the largest health related building project in New Zealand with an initial budget commitment of NZ $1.47 billion. This demonstrates New Zealand government's commitment to delivering

better health outcomes for the population of Otago and Southland. The primary aim of the NDH is to have the capacity to meet the needs of the Southern region for the next 20 years. It is proposed that more contemporary models of care (planned to be delivered in the NDH) will improve the efficiency and effectiveness of services and with improved internal adjacencies and size of clinical areas. This will reduce unnecessary delays, enable shorter lengths of stay and ultimately enhance patient safety and experience.

The necessity for this new infrastructure is based on what is described as the poor condition of the existing Dunedin Hospital buildings, combined with projected service demand which is described as unsustainable. It is reported the current facilities cannot absorb innovations, prevent efficiency gains and care improvements which in turn create challenges with meeting increased demand.[1]

The NDH is being advanced in two stages. The first stage is the Outpatient Building (under construction on the former Wilson site) with practical completion planned for December 2025. The second stage is the Inpatient Building (which will be located on the former Cadbury site), which is now planned for opening in 2029.[2] Figure 1 provides and aerial view of the existing Dunedin hospital and the NDH.

Figure 1 – Dunedin Hospital and NDH aerial location

The overall project has progressed with key deliverables such as the approval for an Indicative Business Case in 2017, the Concept Design, completed, and endorsed in November 2020 and the Final Detailed Business Case (issued 22 March 2021) was submitted to Cabinet in April 2021.

The Inpatient Building is currently in the Design and Development phase of the project lifecycle.

The scope of services to be delivered within the NDH have essentially remained constant since 2019, and the Final Detail Business Case included clinical service capacity for 410 inpatient beds, 15 acute and elective theatres and 30 Intensive care beds (expandable to 40). The requirement for the size of the pathology department was not included in the Detailed Business Case.[3]

[1] Detailed Business Case for the New Dunedin Hospital Project, 9 July 2020
[2] Te Whatu Ora, Event Briefing, New Dunedin Hospital Visit, 1 February 2023
[3] Dunedin Hospital: Current and Future Hospital Capacity

More recently, a value management exercise has been undertaken to address an estimated $200 million cost increase. As a result of this, the NDH has undergone a design reset which has resulted in the approval of a refined plan and aims to preserve as much of the existing design and clinical capacity as possible. The refined plan includes changes affecting the Inpatient Building only. Changes of note from the publicly available document – "Dunedin hospital: Current and future hospital comparison table" are highlighted in Table 1- NDH current and future Value Management Changes relevant to pathology.

Table 1 – NDH current and future Value Management Changes relevant to pathology

Specialty	Changed from	NDH Option 4.5a- Approved Dec 2022
Acute and elective operating theatres	15 (including 4 built as shell)	13 (including 3 built as shell)
Pathology	1300m2 (built as shell)	350m2 (built as shell)

The Final Detailed Business Case states the design of the NDH is based on industry good practice and the gross floor area is based on the Australasian Health Facility Guidelines (Aus HFG), and on benchmarks comparing other health infrastructure projects in Australia and NZ.

Current Dunedin Hospital Overview

The Dunedin Hospital is a 361 bed a university teaching and clinical training hospital of Te Whatu Ora – Southern, operating within the broader health network of Te Waipounamu (South Island). The Southern has regional hospitals in Oamaru, Clyde, Queenstown, Invercargill. With more limited provision in Balclutha and Gore. Christchurch Hospital is the closest major hospital (five hours' drive away). Te Whatu Ora – Southern has the largest geographical catchment area with a population of over 320 000.

The Dunedin Hospital has a close affiliation with the University of Otago and Te Pūkenga (New Zealand Institute of Skills and Technology.)

Dunedin Hospital is equipped to handle complex cases and specialty services provided to manage acute and chronic disease including, but not limited to:

- emergency medicine with over 36,000 presentations per annum
- medicine including specialties such as cardiology, respiratory, endocrinology, renal, neurology, gastroenterology, rehabilitation rheumatology, infectious diseases and palliative care
- adult intensive & high dependency care
- surgery including specialist services such as gastroenterology, orthopaedics, neurosurgery, ear nose and throat cardiothoracic, urology, gastroenterology
- oncology and haematology, including autologous transplants
- maternity
- paediatrics
- neonatal intensive care
- mental health
- sexual health.

Pathology Provider in Dunedin

Currently known as Southern Community Laboratories (SCL), these will rebrand to Awanui laboratories during 2023. Awanui is a private pathology provider operating a large network of diagnostic laboratories and medical services in New Zealand with one laboratory split over two sites in Dunedin.

SCL is contracted by Te Whatu Ora to provide diagnostic hospital (both inpatient and outpatient) and community laboratory services to Dunedin Hospital and to the surrounding community. Approximately two-thirds of the testing performed is community testing, and one-third hospital.

SCL provide a comprehensive range of laboratory tests and clinical pathologists for including biochemistry, haematology, microbiology, immunology, molecular pathology, histology, anatomical pathology, and cytology.

The majority of tests for inpatients, outpatients and the community are performed in the main Dunedin Hospital Laboratory. This site operates 24 hours per day, 7 days per week. Histology and anatomical pathology are undertaken in the nearby Plunket House (~450m away) and specimens from Dunedin Hospital are couriered. Any specialised tests generated by Dunedin Hospital or the community which are unable to be performed locally are forwarded to reference laboratories in Christchurch and Auckland

The range of services SCL provides to support the clinical activities for the Southern region includes:

- phlebotomy (inpatient, ambulatory and outpatients)
- diagnostic testing
- clinical pathologist advice and collaboration with clinical teams and community providers
- transporting specimens from other facilities in the Southern region and community collection centres to the Dunedin SCL laboratory as well as referral of samples to other pathology laboratories when required
- Dunedin SCL acts as a referral laboratory for other Awanui / SCL within the South Island and wider (Nelson Marlborough, Central Otago, Southland)
- fine needle aspirates and bone marrow aspirates
- quality assurance of Point of Care Testing
- teaching and training
- clinical trials and research
- collaboration with NZ Blood Service.

Resourcing to undertake these services includes Medical Laboratory Scientists, Technicians and Clinical and Anatomical Pathologists, Pre-Analytical Technicians and Phlebotomists who work with a range of medical specialists and community providers and are employed by SCL. A number of Clinical Pathologists have dual roles across laboratory, university and clinical work. Pathologist and Medical Laboratory Scientist expertise is routinely required at multidisciplinary team meetings, patient ward rounds, committee meetings, and collection of bone marrows biopsies/ fine needle aspirates.

In 2006, laboratory services for hospital and community testing were combined into the current integrated model for the Southern region. This centralisation has been an effective approach to consolidate scarce resources such as clinical pathologists and enables cost containment of equipment and staffing, consumables, and accommodation.

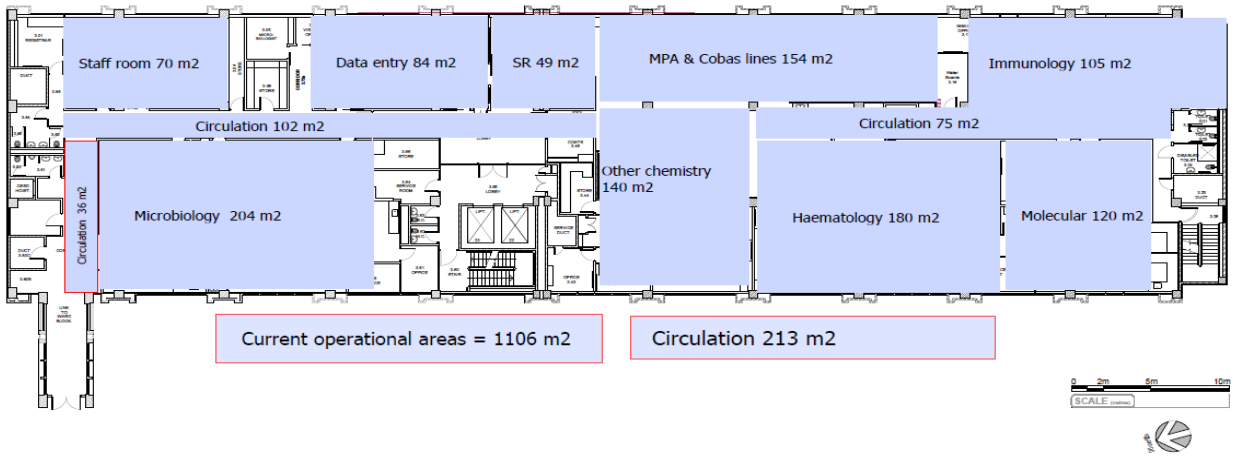
Dunedin Hospital Pathology Laboratory

The pathology department located on the campus of the Dunedin Hospital is in the Clinical Services Building (CSB). The CSB has an importance level (IL) 4 rating however is reported to be at the end of its serviceable life and is uneconomic to repair or refurbish compared to the cost of a new facility. This was a key driver of the NDH, with the Final Detailed Business Case for the NDH stating “The CSB is beyond repair, out of date and may fail operationally”.

The CSB also houses the emergency department, operating theatres, day surgery, outpatient clinics, laboratories, central sterile services, radiology, fracture clinic, and the mortuary.

The accommodation within the pathology laboratory measures approximately 1106m2 which includes cold rooms, offices, storerooms, meeting rooms, specimen reception, processing, laboratory space for chemistry, haematology, microbiology, molecular pathology and immunology. Figure 2 provides the layout for the pathology department in the CSB.

Figure 2 – Pathology department in the Clinical Services Building



The transport of specimens from the clinical areas are sent via a pneumatic tube system and specimens requiring special handing or chain of custody are hand delivered. This includes the transport to the pathology department in the CSB and the laboratory located at Plunket House which is not connected by pneumatic tube and is approximately 450m distance from the Dunedin Hospital. The accommodation in Plunket House is occupied by SCL and measures approximately 1341m2, this includes offices, storerooms, cold rooms land laboratory space.

2 COMPARISON AND BENCHMARKING

The Final Detailed Business Case reference to the Australasian Health Facility Guidelines (Aus HFG) as a baseline was an important starting point for comparing the revised space for the NDH Pathology Department. The Aus HFG, Health Planning Unit B.0550 Pathology Unit, was reviewed to determine the stat laboratory requirements in a hospital laboratory, as the focus of the Health Planning Unit document is the provision of an integrated on- site hospital Pathology Unit with basic core services.

The Health Planning Unit B.0550 Pathology Unit makes no mention of a stat laboratory and states the scale and complexity of pathology units varies, depending on a range of factors which include the role/ level of service, networking arrangements, operational practices, and location.

A review of pathology laboratories in other jurisdictions was undertaken to identify whether these were operating as a stat laboratory, their layout considerations, and the role of a stat laboratory in supporting clinical services. The peer jurisdiction consultation began with senior management of laboratories in Australia as this was thought to be the best approach to obtain an impartial view.

During the benchmarking, documents which included architectural and service delivery plans were reviewed, and consultation was undertaken with pathology senior management. This revealed that pathology departments (within or adjacent to public hospitals) in practice, did not operate as a stat lab. Subject matter experts were asked their advice on whether the function of a stat laboratory and the spatial area in the NDH would sufficiently support the range of services and the proposed acuity, their position was that the size and function would not adequately support inpatient activity. This was reaffirmed in discussions with medical equipment and healthcare representatives, who advised the minimum spatial requirements to house equipment for high volume and throughput exceeded the space allocated in NDH which measured approximately 310m2.

Concurrently, local stakeholders were consulted regarding the size of the pathology department in the NDH and the scope of testing and services. Stakeholders provided feedback advising that a stat lab within NDH was not feasible without consideration of the broader laboratory capacity and that the proposed solution would need to consider access to other laboratories to be a functional solution.

More detailed information beyond the size of their laboratories was then sought from jurisdictions to:

- gain insight on the mechanics of the different pathology service models
- identify whether their service was on a hospital campus
- if on campus – identify what was the spatial allocation to support core functions
- whether the space and layout could be compared to the allocated pathology space in the NDH.

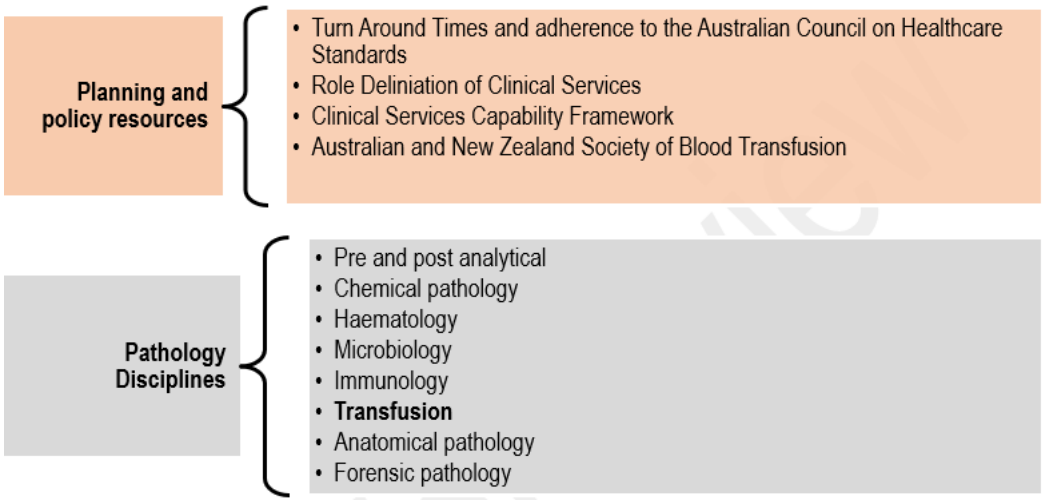
Examples of hub and spoke models were provided to demonstrate the different service operating models and the potential efficiencies of networked services.

2.1 Australia

In the face of the above information, it appeared that a stat laboratory in NDH would not sufficiently support the clinical requirements for the NDH however it was considered necessary to look further into the approach by other jurisdictions in determining the role of their pathology service, the size of the unit and the suitability to support clinical services.

A snapshot of policy and planning resources and the pathology disciplines (defined from the Royal College of Pathologists of Australia) were consistently referred, and a selection are highlighted in Figure 3 below. It is noted this does not cover all policy and planning documents and of the pathology disciplines there is a known difference in scope between Australia and New Zealand pathology disciplines as the former includes Transfusion.

Figure 3 – Snapshot of planning resources and pathology disciplines



Jurisdictions utilise policy documents such as the New South Wales Government - Role Delineation of Clinical Services and/ or state developed Clinical Service Capability Frameworks to support and guide an integrated approach to their planning of pathology units and clinical support services. These are referenced to describe clinical and support services and include a standard set of minimum capability criteria for service delineation. The associated core service functions, of which pathology is categorised, are then mapped to support clinical services.

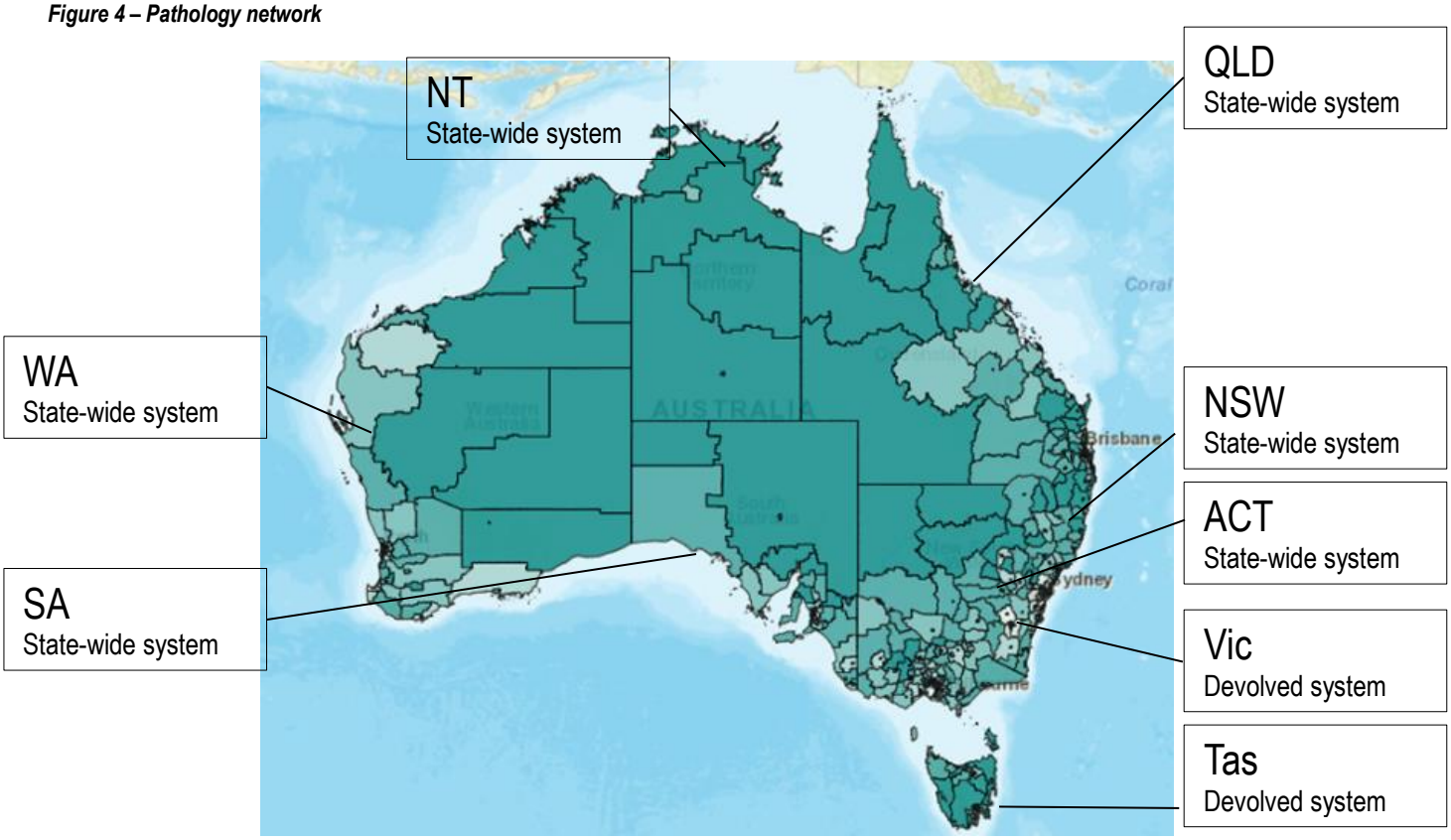
Adopting a similar approach to mapping and planning pathology services for the NDH and utilising these frameworks was discussed and considered. These Australian frameworks are not currently used in New Zealand therefore it was decided, they could not be accurately applied to the New Zealand context during this engagement.

Statewide operational model

The approach to planning a pathology unit suggested in the Health Planning Unit B.0550 Pathology Unit, reaffirmed the jurisdictional and local stakeholder advice that the broader operating and service delivery model must be considered when planning laboratory services and the size of the laboratory within or adjacent to a hospital. An overview of how pathology services are organised and delivered was then sought to provide context for the Australian jurisdictional comparison.

The figure below shows the network at a state and territory level of pathology laboratories that support public hospitals in Australia. Most states and territories have public pathology providers that support clinical services provided by public hospitals. In recent years there has been consolidation of services at a statewide level into single service models. Most states and territories have moved to operate as a state-wide system apart from Tasmania and Victoria.

Figure 4 – Pathology network



Hospital and Pathology Departments

The benchmarking process continued with review of hospital service in other jurisdictions and the size of the pathology laboratories within or adjacent to the hospital.

This section provides a comparative analysis of hospitals and their pathology laboratories. These hospitals were selected due to potential similarities with Dunedin Hospital. These comparators included:

- the range of services
- the catchment area
- acuity and complexity of care

  or
- patient cohorts.

Table 2 Australian Hospitals and pathology comparison, provides a snapshot of services and the pathology unit in South Australia (SA) - The Queen Elizabeth Hospital (TQEH) and the Lyell McEwin Hospital (LMH), and in Queensland (QLD) - The Queen Elizabeth II Jubilee Hospital (QEII) and the Queensland Children's Hospital (QCH).

Table 2 – Australian Hospitals and pathology comparison

Hospital	Catchment	Services	ICU	ED	Theatres	Beds	Areas within Pathology Unit	Pathology sqm
TQEH	250,000 (2022)	Haematology Oncology Renal Transplants Cardiology	14	46	8 Increasing to 12 (2024) **Day surgery:** 4 procedure rooms	444	New laboratory in 2024: Haematology, biochemistry, transfusion 16m2 Satellite Anatomical Pathology 130m2 staff space	698 (2022) 498 (2024)
LMH	NALHN 406,000 (2022) 456,000 (2030)	Obstetrics Cardiology Medicine Oncology Neonatal General surgery	25 (2022) Projected decrease-20	74	9 **Day surgery:** 3 endoscopy 9 birthing rooms 2 cath labs 5 (in neighbouring hospital)	465	Haematology, biochemistry, transfusion Satellite Anatomical Pathology, Microbiology (gene expertise)	1254 (2022)
QEII	359,135 (2020)	Haematology Oncology Cardiology Geriatric	5 Projected increase-7	19 acute 8 fast 3 resus 8 short stay	5 Projected increase to 8 **Day surgery:** 12 (2022) 36 (projected) 3 endoscopy	160	344m2 -haematology, biochemistry, Anatomical Pathology 77m2 staff space	421
QCH	Statewide 5,354,801(2022)	Statewide paeds: Burns Cardiology Cardiac surgery Transplants Oncology Haematology Medicine	36	14	14 **Day surgery:** 48 procedure rooms	380	329m2- haematology, microbiology, biochemistry, transfusion, transfusion)	600

From the above organisations, the QCH was discounted as it operates as a statewide hospital with a large catchment area, the QEII was discounted as it does not have paediatrics or maternity and is 10 minutes from the quaternary hospital, the TQEH was discounted as it does not have the acuity and complexity of care.

The hospital considered to be closest to NDH in terms of the range of clinical services was the LMH and comparable demand. Further details of the LMH from publicly available information were explored and these included:

- catchment area is approximately 400,000
- LMH is the largest hospital in the Local Health Network
- LMH is working towards self-sufficiency of a broad range of clinical services.

The activity levels for the LMH were sought to provide comparative information. A side by side look at key services is provided in Table 3 below. The LMH data references Points of Care which is an umbrella term referring to different kinds of inpatient facilities such as chairs for same day treatment, theatres, cots, birthing rooms etc. The NDH data below was obtained from the Dunedin Hospital Current and Future Capacity document, "Option 4.5a- Approved Dec 2022"and refers to facilities as theatres and beds.

Table 3 – Side by side look at LMH and NDH

Service	Lyell McEwin	NDH
Dialysis	21	4
Maternity	4	9
Day Paediatric	8	4
Day Medical	50	16
Day Surgical	26	30
Cancer	26	Incorporated in med/ surg numbers
ED	99	53
Maternity (overnight)	37	24
Medical/ Surgical (overnight)	354	235
ICU	62	40
CCU	11	Included in the med/surg numbers
Theatres (including same day)	13	26
Birthing rooms	9	9
TOTAL	720	450

Further details on service delivery model of pathology in the LMH was obtained from Executive Management. Further examination of this information showed that the pathology department in the LMH could not be used as a benchmark for size and function as the pathology department:

- is not well configured and has significant unused space
- operates in a large, networked model
- sends the majority of microbiology tests to an offsite laboratory
- sends complex tests to a much larger laboratory which is located within the metropolitan area 40km away
- does not perform bone marrow biopsies and is not a training site for pathologists.

Given this and noting other differences with the planning and operations between the two countries, significant jurisdictional comparison between Australia and New Zealand renders further meaningful comparison difficult. In consultation with the PWG and advice from the local stakeholder group- the Clinical Transformation Group (via the PWG) it was decided that comparison with NZ hospitals laboratories would be more appropriate.

2.2 New Zealand

Against the background of the Australian jurisdiction comparison, benchmarking enquiries of the New Zealand began with an understanding of the pathology service model in New Zealand. The pathology service model between the two countries is similar in that there is currently no national networked model, although stakeholder consultation with pathology experts in New Zealand indicated that this is long term consideration for the country.

Te Whatu Ora funds hospital and community testing which is performed in hospital and community laboratories. The relationships and networking are managed at a local and provider level in line with Te Whatu Ora priorities of planning regionally and delivering locally. In the search for New Zealand comparators, it appears the majority of laboratory services are operated by private pathology providers. These private pathology providers appear to be large organisations which operate at a regional level to provide equity of access to the community and support the local clinical services.

A closer look at potential comparable hospitals and pathology laboratories began with Hawkes Bay and Christchurch, these were quickly discounted due to age of the infrastructure (Hawkes Bay) and size and function of the hospital (Christchurch). More comparable hospitals and pathology laboratories were then explored including Wellington and Tauranga. Comparable hospital and pathology information was sought from the respective representatives.

The laboratory in Wellington Regional Hospital is the tertiary hospital for the sub region and operates as a hub with spoke laboratories in Kenepuru Hospital, Hutt Hospital and Wairarapa Hospital performing their acute fast turnaround tests. The laboratories are operated by Awanui and approximately three-quarters of the testing performed is community testing, and one-quarter hospital testing. The Wellington pathology laboratory is in the main hospital campus and samples are sent to the laboratory by a pneumatic tube system. The majority of inpatient testing is done in Wellington Laboratory, with a small number of tests being sent away to specific reference laboratories.

The main hospital in the Bay of Plenty is Tauranga and is classified as a secondary hospital facility. Tauranga provides a range of services, however unlike NDH, does not have a neonatal intensive care unit and does not provide cardiothoracic and neurosurgical service. The hospital campus houses the pathology laboratory operated by pathlab - a private pathology provider. The Tauranga pathology laboratory is located on the hospital campus and operates in the Bay of Plenty along with the Whakatane pathology laboratory which also operates within the hospital campus. Samples are sent to the pathology laboratory via a pneumatic tube system with a travel time on average of 4 minutes. Tauranga is the largest hospital that pathlab supports and the laboratory performs both community and hospital testing.

The New Zealand data for comparison is tabled below and includes the NDH data obtained from Dunedin Hospital Current and Future Capacity document.

Table 4 – New Zealand hospitals pathology laboratory comparison

Hospital	Catchment	Services	ICU	ED	Theatres	Beds	Areas within Pathology Unit	Pathology sqm
Wellington	500, 000	Forensic services Trauma Oncology Renal (inc transplants) Cardiothoracic Neurosurgery Maternity Paediatrics	24	29	8 **Day surgery:** 3 Endoscopy	535	Biochemistry Anatomic Pathology Immunology Haematology Microbiology Mortuary Support and staff spaces	4000
Tauranga	Bay of Plenty 347,700	Paediatric Interventional Cardiology Surgery Mental Health Maternity Neonatal unit	6 ICU 4 HDU	25	8 **Day surgery:** 2 cath labs 3 endoscopy 1 procedure 1 procedure side	369 With overflow capacity	Microbiology Molecular Histology Haematology Biochemistry Anatomical Pathology Support and staff spaces	5500
NDH	Southern district 326,280	Maternity Paediatrics Renal Major trauma Neurology Cardiothoracic Haematology Oncology Medicine	40	53	13 (inc 3 built as shell) **Day surgery:** 5 procedure 2 Angio 2 Cardiac 4 Endoscopy	410	Laboratory area reception, support spaces and staff spaces)	310 (cold shell)

Whilst the information obtained during the benchmarking exercise was of value for the purposes of ascertaining key elements of planning for pathology departments, a direct comparison between NDH and other jurisdictions was not able to be achieved due to a range of factors including differing operating models, the spectrum of clinical specialties, levels of service, networking arrangements and the model of public/ private pathology.

The assessment of the information gained through the comparisons with Australian and New Zealand informed the approach for the next stage of planning of the NDH pathology department. A number of options were developed considering the requirements of the project and the preferred local requirements.

3 Options

Long-listed options were explored and developed based on consultation with stakeholders and in discussion with the PWG. Five options were constructed with respect to providing pathology services for inpatients at the NDH and considered the combined function of performing community testing. Three options referenced the potential size of the pathology laboratory where it to be located within the NDH. All options consider the location of the pathology department and the service model. Essential to all of the options is the key requirement of redundancy/ business continuity and the possibility of operational services immediately after a disastrous event.

A number of other factors were considered in the development of the options. For example, in search of technological solutions that may reduce the laboratory footprint, discussions with medical device and healthcare companies who specialise in Point of Care Testing (POCT) advised this is the area of most advancement and growth. The uptake of POCT in Australia is higher in regional and remote areas due to system issues such as workforce shortages. In light of this, POCT was initially included in the development of Option 3 and 4 as this was considered to be a key element of options without a laboratory located in the hospital.

In response to the feedback from the local subject matter experts such as the CTG and the PWG, the options were refined and elements such as POCT were removed. This was on the basis that POCT should be considered as fundamental to all options to future proof the hospital, and as the range of POCT is currently limited, POCT is unlikely to offset the significant spatial deficiency in the laboratory at NDH.

3.1 Options Description

Five options (two a sub-set of the same option) were explored with stakeholders and assessed to determine the preferred model and service arrangement. Each option was developed with the potential to achieve the objective of providing pathology for inpatients in the NDH. Whilst all options focus on the NDH, they extend beyond the project and will require wider intervention. The options were developed based on the potential for improvement opportunities and the NDH needs.

Table 5 – Long list Options for NDH pathology

Option	Description
1	**CORE LAB for acute functions**: Establish an IL 4 pathology spoke in the inpatient building (400-600m2) for a broad range of urgent acute inpatient testing and redundancy. The pathology laboratory hub would be IL 3 plus and located OFF the health precinct where 99% of the routine / noncritical hospital and community testing will occur– location to be considered. This option increases the spatial allocation of the pathology unit within the NDH. The space increase is more in line with the onsite hospital pathology laboratories explored during the benchmarking process. The inclusion of the second laboratory located off the health precinct would operate as the hub, a service model described in the Health Planning Unit B.0550 Pathology Unit
2A	**STAT LAB for very acute functions**: Establish an IL 4 pathology spoke in the inpatient building (310m2) for very acute inpatient testing -TAT 2 hours. The pathology laboratory hub would be IL 3 plus and located ON the health precinct with connectivity via pneumatic tube and perform the community and hospital testing. This option is the baseline requiring minimal intervention and considers working within the constraints of the size of the laboratory in the NDH. Given the size, the laboratory within the NDH would perform a restricted range of very acute testing and the second laboratory located on the health precinct in close proximity to NDH, would perform the majority of testing.

2B	**STAT LAB for Redundancy**: Establish an IL 4 pathology laboratory spoke in the inpatient building (310m2) for redundancy. The pathology laboratory hub would be IL 3 plus and located ON the health precinct with connectivity via pneumatic tube and perform the community and all hospital testing. This option is the baseline requiring minimal intervention and prioritises the redundancy and business continuity requirement. This option would see all tests being performed in a laboratory on the health precinct in close proximity to NDH and would utilise the laboratory within NDH for business continuity purposes
3	**Standalone centralised pathology laboratory**: Establish a centralised pathology laboratory which is IL 3 plus ON the precinct with connectivity via pneumatic tube system to cater for urgent testing, redundancy and operational cost operation. This option is most aligned to the service model currently provided through a single centralised pathology laboratory operating at a local level. This option makes provision for all testing to be performed at one site located on the health precinct in close proximity to NDH
4	**Networked centralised pathology laboratory**: Establish a centralised pathology laboratory which is IL 3 plus, considered in a national networked approach ON the precinct with connectivity via pneumatic tube system to cater for urgent testing, redundancy and operational cost operation. This option considers local and national redundancy with a service model operating in a centralised pathology laboratory on the health precinct as part of a national networked pathology service.

3.2 Evaluation Criteria

Assessment mechanisms were developed which included evaluation criteria based on turnaround times, volumes, operational efficiencies, redundancy, capital costs and teaching and research. Following review of the criteria and the assessment methodology, the PWG recommended a phased evaluation approach and a three-point scale scoring system to assess the options. The criteria and scoring process are identified below.

Assumptions

The following assumptions apply to the assessment process:

- the principles of Tikanga Māori- Body fluids and tissue are culturally significant, and it is therefore important that the principles of Tikanga Māori are acknowledged, followed, and respected[4]
- tracking systems are currently standard practice
- POCT is implemented and supported in NDH in line with the Functional Brief and Schedule of Accommodation
- a pneumatic tube system will be utilised to ensure the smooth and efficient transport of specimens throughout NDH and the health precinct
- a courier system will be utilised for transport of specimens outside of the health precinct
- internal adjacencies of the pathology laboratory and high pathology use departments within NDH are critical.

Development of Evaluation Criteria

Three sets of criteria were defined and developed as a framework to evaluate the options. The criteria were used in a phased manner for the evaluation purpose. The first set of evaluation criteria was defined based on critical functions, Options were evaluated and excluded immediately if they did not meet the following minimum critical function criteria:

Pathology Service Functions- Minimum Requirements

[4] Tikanga Maori, A Guide for Health Care Workers

- enables urgent/critical turnaround times (and in appropriate volumes) to support time-critical expected inpatient clinical services
- enables appropriate turnaround times and appropriate volumes to support non-urgent inpatient clinical services
- builds in appropriate redundancy to ensure business continuity
- post-disaster resilience - continue to provide acute time-sensitive testing.

The remaining options were then assessed against the second set of primary evaluation criteria:

Primary Evaluation Criteria

1) Supports optimal operational efficiencies.
   Efficiencies with staffing, service delivery, consumables, storage.
   Efficient utilisation of each piece of equipment, and human resources
   Optimises floor area relative to activity.
2) High degree of adaptability to respond to urgent requirements.
   Embedded adaptability to cope with unexpected or surges in demand and changes to equipment and staffing.
3) Efficient logistics -specimen handling and tracking
   Increased complexity, particularly around logistics, may introduce clinical risk (for example with processing delays or sample transport issues).

Options were further reviewed, and the added value of the following was considered:

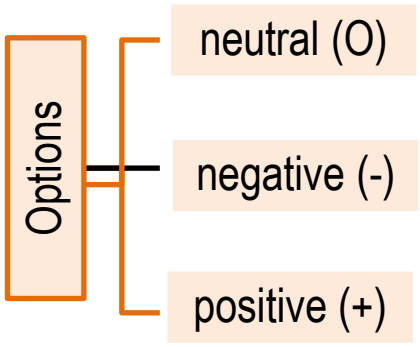
Additional considerations

1) Future flexibility
   Allowance for technological advancements, innovation, automation, and digital solutions to support future changes in demand and complexity.
2) Supports training and development of staff.
   Supports apprenticeship model of training, staff development and cross-specialization of technical staff.
3) Clinical proximity
   Bi-directional travel between clinical and acute laboratory activities including (but not limited to) frozen sections, ward rounds, acute slide review, bone marrow biopsies, patient consults, multidisciplinary meetings, and teaching.
4) Supports and enhances collaborative research
5) Equity of access.

Scoring system

A three-point scale was developed to assess the merit of each of the options, see Figure 5 below. The positive result indicates the option is perceived as positive to the criteria, the negative indicates that option response is negative to the criteria, and the neutral doesn't add or detract any value.

Figure 5 – Scoring system



Evaluation

The long list of options was evaluated against the minimum requirements. This first phase of evaluation identified that clearly there were two options that would not progress. Options 2A and 2B were immediately discounted as the laboratory size within NDH would not meet the requirement of enabling critical turnaround times and appropriate volumes of urgent testing. Although these options require minimal intervention by the NDH project, the advice obtained during the benchmarking highlighted the current size of the planned laboratory within NDH is small and will restrict the pathology service in terms of capacity and capability. Senior management from pathology departments in other jurisdictions, had difficulty in aligning the infrastructure, with the equipment and workforce required to deliver a pathology service that would support the proposed complexity and range of services planned for the NDH.

Further to this, information obtained from discussions with medical equipment and healthcare representatives, provided further justification for this evaluation decision. Their advice was the small size of the laboratory area in NDH would not sufficiently support the potentially large volume of critical tests. The size of the equipment directly correlates with the volume of samples and therefore the higher the volume, the larger the equipment required for processing.

The service delivery model Options 2A and 2B would be heavily reliant on the hub laboratory (located outside of the hospital) to meet maximum throughput and critical turnaround times. Table 6- highlights the immediately discounted options.

Table 6 – Immediately discounted options

Option	Description
2A	**STAT LAB for specific acute functions**: Establish an IL 4 pathology spoke in the inpatient building (310m2) for specific acute inpatient testing-TAT 2 hours. The pathology laboratory hub would be IL 3 plus and located ON the health precinct with connectivity via pneumatic tube and perform the community and hospital testing.
2B	**STAT LAB for Redundancy**: Establish an IL 4 pathology laboratory spoke in the inpatient building (310m2) for redundancy. The pathology laboratory hub would be IL 3 plus and located ON the health precinct with connectivity via pneumatic tube and perform the community and all hospital testing.

The remaining options from here on are referred to the short list. The evaluation of the short list options utilised the three-point scale (shown against each of the options in the table below) to assess the remaining three options based on the Primary Evaluation Criteria.

Table 7- Short list options evaluation

Option	Efficiencies	Adaptability	Logistics	Result
1	-	0	-	-2
3	+	+	+	+3
4	+	+	+	+3

Option 1 was discounted as it achieved a negative score against the efficiencies criteria due to the requirement to operate services cross two laboratories. This decentralised model, inherently results in duplication of staffing, equipment consumables and increases service delivery costs. Option 1 also achieved a negative score against the logistics criteria for similar reasons. There is risk with dual handling of specimens, processing delays and the transporting of specimens between two sites. This model would be a significant change of the current service delivery model for testing samples generated from inpatients.

Option 3 and 4 achieved positive scores against efficiencies, adaptability, and logistics. The single location reduces choice and error with logistics and efficiencies, which are realised through a centralised location of resources and equipment. Co-location of human resources within centralised infrastructure enables rapid response to workflow demand with scalability to cope with surges.

Options 3 and 4 were also favourable in terms of meeting the minimum requirements of performing testing of samples with critical turnaround times and for the required volumes. The single location enables adaptability to prioritise inpatient clinical testing requirements, outpatient testing or local community testing.

The Additional Considerations were applied to identify whether a single option was preferred. Option 4 operating as a network of pathology laboratories across the country enables service configuration in response to need, provides redundancy and enables diversity of training the pathology workforce.

Conversely, Option 3 of a centralised pathology service locally based, provides agility and flexibility in response to local demands, supports equitable access and response to testing based on the regional need and supports local training.

Destravis understands, the outcome of the evaluation assessment is in alignment with the discussions of stakeholders who reviewed the options and discussed the pros and cons at the Clinical Pathology Expert meeting with CTG. The meeting discussion was documented, and their assessment provided via the PWG. Members at this meeting identified that options 1, 2A and 2B (effectively operating as a split site model) would introduce risk and uncertainty with the splitting of hospital work, or separating hospital and community work.

Options 3 and 4 were the preferred although acknowledged there was less resilience in a disaster, (depending on the type of building), by operating a single site.

The future for pathology services was discussed and it was noted that there was likely benefit in more networked model in the future.

Outcome

Following the evaluation against the minimum requirements and the primary evaluation criteria, Option 3 and 4 are the preferred options. The operation of a centralised laboratory enables the pathology disciplines to be organised in a single location to work most effectively. The consolidation of all pathology resources enables the key service requirements of testing volumes and time sensitive tests be performed within acceptable timeframes and equally be adaptable to changes in the demand.

Moreover, basing the laboratory service within the health precinct enables a smooth logistic system, where samples are transported for testing to the laboratory in very close proximity to the NDH. Colocation supports easy access for the workforce who may have a dual role at the NDH. The location within the health precinct enables consultative, academic and laboratory functions of pathologists to effectively continue.

It is noted, these Option 3 and 4 are most aligned to the organisation of the pathology service in Dunedin currently, where the services for inpatients, outpatients and community pathology testing are organised through a centralised model.

Conclusion

This New Dunedin Hospital Project Options Report for the Pathology Department seeks to demonstrate the variability with the size and role of pathology laboratories to perform inpatient testing. The benchmarking identified that there are key variables that influence the level of pathology services. These variables include inpatient acuity, and the delivery of clinical services that require frequent critical testing such as trauma, oncology, and maternity. Given the NDH plans to deliver high acuity and a multitude of clinical services, the role of a stat laboratory within NDH would not sufficiently support the pathology requirements generated from this inpatient activity.

The Options for the future NDH, were developed in consideration of the Dunedin circumstances and take into account the pathology service models in New Zealand. The evaluation criteria and methodology were developed for the purposes of identifying the best option for NDH inpatients. The justification of the preferred option(s) provides information to assist Te Whatu Ora with their decision on the preferred future solution for the pathology service and to provide a baseline for planning in consideration of the impact on the capital build, the project timelines and the broader pathology solution. The following recommendations have been developed to support the planning process.

4 RECOMMENDATIONS

The recommendations below are based on:

- desktop review of information
- the information and data provided during the jurisdictional analysis and the benchmarking process
- feedback provided to Destravis from stakeholders
- consideration of good practice and governance models and learnings from other jurisdictions.

Recommendation 1

It is recommended that Te Whatu Ora explore the opportunity to establish a national working group to investigate the potential merits of a national networked approach to pathology (Option 4) in comparison to a local solution for a centralised laboratory (Option 3).

Given that this recommendation presents a significant change to the current model at a local and national level, it would be essential for this work to involve representatives from across the country. This strategy would explore whether there are benefits of a networked system across New Zealand, in comparison to each region being supported through locally operated pathology providers. The investigation must include consideration of equity of access requirements, the need for networked capacity and capability and whether this could be leveraged, given seismic and isolation risks.

This rationale for this recommendation is based on the benefits of operating in a highly networked system which were raised by peers in New Zealand and Australia during this engagement. A multitude of benefits with a single national pathology provider were suggested. These include, economies of scale achieved by testing higher volumes, efficient purchasing models, improved redundancy and business continuity capability, improved research capability and funding mechanisms, workforce attraction and retention and adoption of innovative diagnostic solutions.

Recommendation 2

It is recommended that Te Whatu Ora undertake a detailed investigation of the short, medium and long-term activities that are required to implement Options 3 and 4. These activities must be compared to the timeframe of commissioning of the NDH. Examples of activities may include:

- enquiries about the potential utilisation and extension of the design life of the existing Dunedin Pathology Laboratory in the existing hospital and of Plunket House
- establishment of a new lab within an existing building (suitable in size and location) in the health precinct, and the timing of when this would be available
- development of a new laboratory building in the health precinct and the timing of when this would be available.

In developing and considering these recommendations it should be noted that preferred options may not be aligned with the time frame for the project and thus interim measures may need to be investigated to enable uninterrupted pathology service delivery.

Recommendation 3

It is recommended that Te Whatu Ora adopt Australian planning frameworks for defining and articulating the role of pathology services to support clinical services in hospitals for use in New Zealand. Documents such as the NSW Health Guide to the Role Delineation of Clinical Services are referred to in the Australasian Health Facility Guidelines and are utilised by public health departments when developing functional and strategic plans. The use of these frameworks would support a shared understanding by all stakeholders of the function, scope and priorities of the pathology service. It would

help to develop a statement of service, functional and governance structures and the links and inter-relationships between services and other institutions such as the University of Otago.

APPENDICES

Appendix A - Stakeholder consultation and jurisdiction peers

Table 7 provides a list of stakeholders consulted (directly or indirectly) and jurisdictional peers who provided input as part of the review and options evaluation process.

Table 7 – List of project stakeholders

Name	Role	Department /Organisation
Project Working Group- NDH		
Tony Lloyd	Programme Director	Infrastructure and Investment Te Whatu Ora
Marcus Read	Director of South Island Operations	Resource Coordination Partnership (RCP)
Serina Rose	Associate	Resource Coordination Partnership (RCP)
Jim Coard	Project Director	Infrastructure and Investment Te Whatu Ora
Bridget Dickson	Programme Director	Te Whatu Ora- Southern
Nikki Scott	Clinical Project Manager	Te Whatu Ora- Southern
Clinical Transformation Group		
Dr Sheila Barnett	Clinical Transformation Group (Chair)	Te Whatu Ora-Southern
Prof Patrick Manning	Clinical Transformation Group (Deputy Chair)	Te Whatu Ora-Southern
Dr Joel Papak	Clinical Transformation Group (Physician rep)	Te Whatu Ora-Southern
Facilities Transformation Group (User Group)		
Trevor English	Head of Strategic Business Development	Awanui
Andrea Guillemot	General Manager- Te Waipoumanu	Awanui
Roger Barton	Quality Manager, SCL	Southern Community Labs (SCL)
Prof Ian Morison	Laboratory Haematologist and Professor of Haematology	University of Otago
Clinical Reference Group		
Dr Juliet Elvy	Microbiologist	Southern Community Labs (SCL)
Dr Michael Lau*	Anatomical Pathologist	Southern Community Labs (SCL)
Roger Barton	Quality Manager	Southern Community Labs (SCL)
Prof Ian Morison	Laboratory Haematologist and Professor of Haematology	University of Otago
Jenny Grant*	Medical Laboratory Scientist, Molecular Pathology	Southern Community Labs (SCL)
Helen Vanderloo	Medical Laboratory Scientist, Immunology	Southern Community Labs (SCL)
Dr Anna Wan*	Laboratory Haematologist	Southern Community Labs (SCL)
Prof James Ussher	Clinical Microbiologist, Professor of Immunology and Microbiology	University of Otago
Gayleen Parslow	Medical Laboratory Scientist, Microbiology	Southern Community Labs (SCL)
Dr Ian Phillips	Chemical Pathologist	Southern Community Labs (SCL)
YiiSen Wee*	Medical Laboratory Scientist, Haematology	Southern Community Labs (SCL)
Dr Lucy Pemberton*	Laboratory Haematologist and Professor of Haematology	Southern Community Labs (SCL)

Jurisdictional peers		
Matt Ford	Operations Manager	Pathology Queensland, Queensland Health
Rachel Campanella	Senior Project Manager	The Queen Elizabeth Hospital Central Adelaide Local Health Network (CALHN)
Megan Freeman	Central Adelaide Health Network Manager	SA Pathology SA Health
Julie Hartley-Jones	Group Executive Director	Statewide Clinical Support Services SA Health
Lucas Semmler	Executive Director	SA Pathology SA Health
Russell Cooke	Senior Systems Development Manager	Te Whatu Ora- Capital, Coast and Hutt Valley
Sara Knight	Executive Assistant to CEO	pathlab, Tauranga
Nathan Toms	Decision Support Analyst	Te Whatu Ora, Hauora a Toi Bay of Plenty
Gloria Crossley	Interim General Manager	Te Whatu Ora, Cantebury Health Laboratories
Rob O'Jala	Clinical lead Facilities Development	Te Whatu Ora

*Denotes stakeholders who were invited to meetings, received the minutes but did not attend meetings.

Appendix B - Documents

Table 8 provides a list of documents which were provided by the Project Working Group, stakeholders, jurisdictional peers or publicly accessed.

Table 8 – List of reference documents

Reference documents
General Arrangements Plans -A10 Series NDH
Dunedin Hospital: Current and future hospital capacity comparison table
Te Whatu Ora, Event Briefing -New Dunedin Hospital visit
Cabinet paper -Dunedin Hospital Redevelopment – Site Recommendation (Redacted)
Final Detailed Business Case New Dunedin Hospital
Southern District Health Board Site Masterplan
Dunedin Department location
CSB-3 Clinical Services Building-3
NDH - Site Map and Mass Plans
NDH - Pathology Bay POCT equipment by area
WAM-FDB-0300-AR-00291Pathology_Final_Signed
New Dunedin Hospital Project Meeting Summary: Clinical Pathology Expert meeting with CTG
NDH Letter Final Version
Pathology Clinical Directors Responses
Role Delineation of Clinical Services
Clinical Services Capability Framework v.3.2
Clinical Services Capability framework, Fundamentals of the Framework 2016
NATA procedures for accreditation
Tikanga Māori A Guide For Health Care Workers (Kaimahi Hauora)
The Queen Elizabeth Hospital-Stage 3 Redevelopment Site Development & Master planning
Copy of Equipment list SCL
Copy of 230309 NDH Pathology SoA SCL 2nd draft
TQEH_CD2-General Arrangements Plans
Public Pathology- Value and Opportunities
QCH Floor Labs 2013-2014
2023-05-31_ Meeting Summary Pathology and CTG