OCTOBER 2022

NORTHSHORE HAMILTON Priority Development Area

Infrastructure Planning Background Report

Economic Development Queensland

Creating and investing in sustainable places for Queensland to prosper

Queensland Government

ACKNOWLEDGEMENT

Economic Development Queensland (EDQ) acknowledges the traditional owners of the land and waters of the Northshore Hamilton PDA. We also Acknowledge the continuing culture of the Yagera and Turrbal people; and the influence and contribution their culture brings to the Northshore Hamilton PDA.

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1 Background

The Northshore Hamilton Priority Development Area (PDA) was declared on 27 March 2008 under the *Urban Land Development Act 2007* (since repealed and replaced with the *Economic Development Act 2012*). The Development Scheme for the PDA (the development scheme) was adopted on 3 July 2009 and is currently under review together with preparation of a Development Charges and Offsets Plan (DCOP).

The DCOP addresses the delivery of trunk infrastructure for the water supply, sewerage, stormwater, transport, and parks and community facilities networks supporting planned development in the PDA.

The PDA is located within the Brisbane City Council (BCC) local government area. A map showing the extent and boundary of the PDA is provided in Appendix A.

1.1 Purpose of Infrastructure Planning Background Report (IPBR)

This IPBR documents information relevant to infrastructure planning and development charging in the Northshore Hamilton PDA. The report will assist users of the PDA Development Scheme (section 3 Infrastructure Plan) and the DCOP to understand how infrastructure planning was undertaken and how development charges were determined.

Additionally, Section 4 of this report outlines the Desired Standard of Service (DSS) for the Northshore Hamilton PDA. The DSS is a summary of the trunk and non-trunk design standards used to inform the planning of the infrastructure networks in Northshore Hamilton. These standards also provide guidance to applicants of the form, type and arrangement of infrastructure that is likely to be acceptable to EDQ in the Northshore Hamilton PDA.

These Standards generally reflect those currently adopted by Brisbane City Council under the Local Government Infrastructure Plan (LGIP), except where specific reference indicates otherwise.

2 Growth projections

2.1 Introduction

The projections of future residential and non-residential growth within the Northshore Hamilton PDA provide a consistent basis for the planning of infrastructure to service the PDA. The following section is a summary of the growth projections prepared for the PDA.

Further details regarding the process for determining development capacities, growth rates and staging of the PDA are provided in the *Northshore Hamilton PDA - Development Capacity Assessment* (Integran, 2019). This report has been prepared to independently assess ultimate capacity projections of developable land in the PDA and may present slightly different results to those used to inform the infrastructure network modelling reports.

2.2 Growth projection years

The Northshore Hamilton growth projections were prepared for the base date 2019 and the following projection years:

- 2021
- 2026
- 2031
- 2036
- Ultimate development

2.3 Potential development capacity

The ultimate potential development capacity that may be achieved on premises within the PDA was calculated based on the type and density of development allowable under the PDA development scheme (the planned density), taking into account factors such as existing and committed development, and plot size to determine a likely development outcome.

Following calculation of the potential development yield (in GFA m²), these areas were then distributed between various land uses (retail, commercial, community, industrial and residential), in accordance with the GFA Distribution table attached in Appendix B. Residential floor space was converted to dwellings on the basis of assumptions in relation to average dwelling size, as shown in Appendix B.

2.4 Development constraints

The projected capacity of developable land in the PDA has been calculated taking into consideration known development constraints which may limit the potential yield of land. Absolute constraints (including future road and drainage corridors) were addressed as part of the PDA development scheme. Further limitations such as current development approvals and recent developments (particularly lower yielding developments) were also taken into account to ensure the potential development yield of these sites was accurately reflected and not over-estimated.

2.5 Growth rates

The assumed rate of growth for residential and non-residential development was determined based on the Property Market Research Report (July 2019) for the PDA, prepared by Foresight Partners Pty Ltd. The growth rates adopted were:

- Residential growth – 250 dwellings per annum (medium forecast)
- Commercial floorspace – 3,000m² GFA per annum (medium forecast).

The assumed growth rates for other non-residential uses has been determined based on the following:

- Retail floorspace – Annual GFA growth set to a linear growth projection so that it will reach 'ultimate development' at the same year as ***residential*** growth reaches 'ultimate development'
- Community floorspace – Annual GFA growth set to a linear growth projection so that it will reach 'ultimate development' at the same year as ***residential*** growth reaches 'ultimate development'
- Industrial floorspace – Annual GFA growth has been given a linear growth projection so that it will reach 'ultimate development' at the same year as ***commercial*** growth reaches 'ultimate development'

Existing population and non-residential GFA has been determined by EDQ through assessment of Land use data as at 2018, plus additional development occurring up to June 2019.

2.6 Growth projections summary

The growth projections for the PDA are summarised in Table 2 and Table 3. The information has been based on the growth rates for residential and commercial land uses in the PDA.

Population forecasts are based on an average household size of 1.73 persons per dwelling for the Northshore Hamilton PDA (Source: Foresight Partners, July 2019).

Forecasted employees within the PDA have been derived through assessment of the Brisbane City Council LGIP Schedule 3 tables, specifically the GFA and Employees assumptions for the "Inside Priority Infrastructure Area (total)" reporting category. This reporting category was used as it provides an averaged assessment across the urbanised employment areas.

An employee to floorspace ratio has then been determined for each development type at the ultimate development horizon and applied to the Non-residential floorspace projections in Table 2 for each non-residential development category.

Table 2 — Residential dwellings and non-residential floor space projections

Column 1 Description	Column 2 Projections by year					
	2019	2021	2026	2031	2036	Ultimate development
Residential dwellings	2,748	3,248	4,498	5,748	6,998	14,167
Non-residential floor space (m2 GFA)	176,328	194,750	240,807	286,863	332,919	819,313

Table 3 — Population and employment projections

Column 1 Description	Column 2 Projections by year					
	2019	2021	2026	2031	2036	Ultimate development
Population	4,754	5,619	7,782	9,944	12,107	24,509
Employment	3,081	3,674	5,157	6,639	8,121	25,491

3 Demand projections

Growth projections are converted into demand projections to enable infrastructure planning to be undertaken.

Networks express demand using different demand units. The demand units used by each local network in the PDA are as follows:

- For the water supply network, equivalent persons (EP)
- For the sewerage network, equivalent persons (EP)
- For the stormwater quantity network, impervious hectares (Imp Ha.)
- For the transport network, trips per day (trips)
- For the parks and community facilities network, equivalent persons (EP)

The demand generation rates used by each network to convert growth projections into demand are stated in Appendix C. These have been derived from the Brisbane City Council LGIP.

The demand projections for each network are stated in Appendix D.

4 Desired standard of service

4.1 Water supply

EDQ have adopted Urban Utilities' (UU) Desired Standard of Service (DSS) for the water supply network contained in the UU Water Netserv Plan, as may be amended from time to time. The latest DSS can be accessed on the UU website.

4.2 Sewerage

EDQ have adopted UUs' DSS for the sewerage network contained in the UU Water Netserv Plan, as may be amended from time to time, with the exception of the items listed below. The latest DSS can be accessed on the UU website.

The following additions and exceptions have been adopted:

- Gravity Sewers
  - Depth of Flow, PWWF: Existing gravity sewers must maintain PWWF depth no greater than 1m from ground level
  - Minimum Shear stress: Proposed sewers shall achieve self-cleansing shear stress of 1.6Pa at PDWF. This is in lieu of minimum velocity requirements outlined in SEQ Code, but consistent with WSA02-2014.

4.3 Stormwater

The DSS for the stormwater network are adopted to align with those within the BCC LGIP, as may be amended from time to time. Refer to the Brisbane City Plan, Part 4, section 4.5.4 for additional detail.

4.4 Transport

EDQ have adopted BCC's DSS, as per the LGIP, for all transport networks (including Roads, Pathways and Public Transport), as may be amended from time to time. However, where Council's DSS is in conflict with the following standards, the standards listed below prevail:

For the road network:

- The proposed PDA Internal Road Hierarchy, Concept and typical cross-sections are provided in Appendix E;
- The following design standards for the typical road typologies:

Table 4 — Road design standards applicable to the Northshore Hamilton PDA

Design Standards	Suburban Road	District Road	Neighbourhood Road	Local Road
General requirements				
Typical sign posted speed (maximum)	60-70 km/hr	60 km/hr	50 km/hr	50 km/hr
Direct lot access	No	No	Yes	Yes
Cross section				
Reserve width (minimum)	33m – 40m	20m – 27m	20m	18.6m
Number of traffic lanes	As directed by traffic modelling			

Design Standards	Suburban Road	District Road	Neighbourhood Road	Local Road
Minimum width of through traffic lanes	3.5m	3.5m	3.5m 5.5m[1]	5.5m[1]
Minimum width of parking lanes	N/A	>2.5m	>2.5m	>2.5m
Minimum bicycle lane width	2.0m(2)	2.0m(2)	2.0m	2.0m
Separated cycleway width	One way 2.0m Two way 3.0m	One way 2.0m Two way 3.0m	One way 2.0m Two way 3.0m	One way 2.0m Two way 3.0m
Bus facilities	Indented bus bay	On-road bus stops within parking lane if already provided OR Designed for indented bus bay where no parking lane	N/A Bus routes not provided on Neighbourhood Roads	N/A Bus routes not provided on Local Roads
Verge width (minimum)	4.25m	4.25m	4.25m	4.25m
Footpath width	2.0m – 4.5m	2.0m – 4.5m	2.0m – 4.5m	>2.0m

- Intersections as per the locations and configurations identified in Section 5.3.2 of the Transport Master Plan – Northshore Hamilton PDA (Cardno, Oct 2021).

For the shared pathway network:

- The Department of Transport and Main Roads *Technical Note 128 Selection and Design of Cycle Tracks.* These standards provide for the following minimum widths:

Table 5 — Pathway design standards applicable to the Northshore Hamilton PDA vs BCC

Proposed Infrastructure	PDA Minimum Width	BCC Standard Width
Separated Cycle Track – One way	2.0m – 3.0m	N/A
Separated Cycle Track – Two**Error! Bookmark not defined.** way	3.0m – 4.0m	N/A
On road cycle lane[2]	2.0m	2.0m
Shared Path[3]	3.0m – 4.0m	3.0m – 6.0m

For the public transport network:

- The development of the PDA should aim to achieve the following:

Table 6 — Public transport accessibility, frequency and capacity standards applicable to the Northshore Hamilton PDA

Public Transport Element	Bus	Ferry	Rail
Walkable catchment	400m	800m	800m

[1] 3.5m per lane or 5.5m over 2-lanes undivided.
[2] Minimum width to be determined in accordance with Austroads Guide to Road Design – Part 3 and the Department of Transport and Main Roads Guide Selection and Design of Cycle Tracks.
[3] Minimum width to be determined in accordance with Austroads Guide to Road Design- Part 6A Pedestrian and Cyclist Paths.

Public Transport Element	Bus	Ferry	Rail
Peak Period Frequency	5-10 minutes	10-15 minutes	6-10 minutes
Vehicle passenger capacity	60 people/vehicle	150 people/vehicle	600 people/vehicle
Estimated Passenger Volume (Peak Hour)	180-360 people/hr (one direction)	300-450 people/hr (one direction)	360-600 people/hr (one direction)

4.5 Parks and community facilities

The DSS for the parks network is as follows:

- provide an accessible network of parks and recreation facilities that meets the needs of the population (residents) and employees in accordance with the following:
    - the minimum size and accessibility standard for the parks network stated in the Brisbane City Council LGIP; and
    - where the provision of a new or upgraded park within the PDA is possible and appropriate.
- locate future trunk infrastructure for the parks network identified in the schedules of works and DCOP Infrastructure Plans.
- embellish the parks network to complement the type and purpose of the park in accordance with the embellishments standard for the public parks network stated in the Brisbane City Council LGIP.
- Align with the opportunities available and outcomes sought though a 'needs-based assessment' for parks and community facilities within the PDA, including:
    - Create a new iconic riverfront public destination park;
    - Contribute to city building and exemplify best practice waterfront planning and place making;
    - Enhance public connectivity to the Brisbane River's recreation and amenity values;
    - Sporting facilities co-located with the future school site and centrally within the PDA, providing for innovative and multi-use options; and
    - Achieve an appropriate supply of communal and private open space.

Note that the term "Regional" park under the DCOP has the same meaning as Metro under the BCC LIGIP.

EDQ have included land within the Community facility zone in the proposed PDA development scheme. In addition, EDQ have nominated a parcel of land in the DCOP for proposed community facility development. Any future development of community facilities on this parcel will adopt BCC's DSS for the land for community facilities network contained in the Brisbane City Plan 2014, as may be amended from time to time. The latest DSS can be accessed on the BCC website.

5 Infrastructure planning

5.1 Introduction

The infrastructure plans for the Northshore Hamilton PDA have been prepared to service ultimate development, given the adopted growth rates, this results in an ultimate planning horizon of 2065 for residential, retail and community development, and significantly longer with respect to commercial and Industrial outcomes.

In June 2018, BCC adopted a LGIP with a 10 year planning horizon for financial modelling purposes. The extent of the current infrastructure performed provided by Brisbane under its LGIP is limited to 2031 and therefore, the PDA has adopted the same horizon in the development of the detailed cost schedules and mapping. The ultimate infrastructure network (i.e. infrastructure required post 2031) is provided within the DCOP for context.

The DCOP does not identify any Infrastructure requirements external to the PDA. These requirements are subject to further assessment and discussion with the relevant agency.

5.2 Water supply

Planning of water supply infrastructure to service development within the PDA is documented in the following report(s):

- Northshore Hamilton PDA – Water Supply and Sewer Preliminary Analysis (Cardno, November 2020).

The key criteria which are the basis for the water network planning are outlined in the SEQ Water Supply and Sewerage Code (SEQ W&S D&C Code).

5.3 Sewerage

Planning of sewerage infrastructure to service development within the PDA is documented in the following report(s):

- Northshore Hamilton PDA – Water Supply and Sewer Preliminary Analysis (Cardno, November 2020).

The key criteria which are the basis for the sewerage network planning are outlined the SEQ Water Supply and Sewerage Code (SEQ W&S D&C Code) with the additions and exceptions as outlined within Section 4 of this report.

5.4 Stormwater

Planning of stormwater infrastructure to service development within the PDA is documented in the following report(s):

- Hamilton Northshore Trunk Drainage Assessment (BMT, October 2021); and
- Northshore Hamilton PDA Stormwater Network Analysis Review (Cardno, Oct 2019).

5.5 Transport

Planning of transport infrastructure to service development within the PDA is documented in the following report(s):

- Transport Master Plan – Northshore Hamilton PDA (Cardno, Oct 2021); and
- Northshore Hamilton PDA – Infrastructure Analysis & Costings Report – Road Network (Cardno, Aug 2019)

5.6 Parks and community facilities

Planning of parks and community facilities infrastructure to service development within the PDA was informed by the following report(s):

- Open Space Analysis – Northshore Hamilton PDA, (Ross Planning, Sept 2016); and updated by
- Northshore Hamilton PDA – Infrastructure Analysis & Costings Report – Open Space Network (Cardno, Sept 2019)

The Open Space Analysis report concluded that given the location's river frontage and medium-high density living proposed, a needs-based assessment is a more realistic and desirable approach to greenspace planning. Therefore, EDQ have adopted a needs-based approach to determine requirements for parks and land for community facilities in the PDA.

EDQ, in consultation with BCC and the Department of Education, have identified a range of community facility opportunities for the PDA. Detailed site investigation and planning investigations for the land proposed to be included in the community facility zone within the PDA development scheme is ongoing.

The key recommendations and outcomes sought for the PDA are identified within Section 4.

6 Infrastructure costs

The cost of infrastructure has been determined as follows.

6.1 Cost of land

The cost of future infrastructure (land) was determined for all networks on a site specific basis using Statutory Land Valuation procedures performed by the Queensland State Valuation Service under the Land Valuation Act. No contingencies or other cost allowances are applied to land valuations under the DCOP.

The land values included in the schedule or works (Appendix F) are in FY2018/19 dollars and are separately itemised for each DCOP item (where it is required). Land values are subject to annual indexation using a three year rolling average of the Consumer Price Index (CPI).

6.2 Cost of works

The cost of future infrastructure (works) was determined for each network as follows:

Water supply – Cost estimates were sourced from the 'Northshore Hamilton PDA – Water Supply and Sewer Preliminary Analysis' (Cardno, November 2020), which utilises unit rates in its methodology for costing. However, EDQ has applied a higher unit rate to 315mm water mains then the rate outlined in the Northshore Hamilton PDA – Water Supply and Sewer Preliminary Analysis. This is to account for potential depth and width of trenches, shoring of trenches, construction through of existing pavements and reinstatement of pavements. The rates adopted by EDQ are detailed in Table 7.

Additionally, there are variations in the length of the water pipes used to calculate costs in the Northshore Hamilton PDA – Water Supply and Sewer Preliminary Analysis report and what is included in the IPBR. The lengths included in the IPBR are derived from EDQ's GIS mapping of the assets.

Table 7—Water supply network unit rates

Asset Description	Unit Rate $ / Length (m) *(presented in 2019 dollars)*	Cost Adjustment Factors *(applied to account for Acid Sulphate soils and highly developed location)*
315mm Water Main	$719	2.28
355mm Water Main	$719	2.28
450mm Water Main	$990	2.28

Sewerage – Cost estimates were sourced from the 'Northshore Hamilton PDA – Water Supply and Sewer Preliminary Analysis' (Cardno, November 2020), which utilises unit rates in its methodology for costing. These rates are detailed in Table 8.

As with the water supply infrastructure, there are variations in the length of the sewer pipes used to calculate costs in the Northshore Hamilton PDA – Water Supply and Sewer Preliminary Analysis report and what is included in the IPBR. The lengths included in the IPBR are derived from EDQ's GIS mapping of the assets.

Table 8—Sewerage network unit rates

Asset Description	Gravity Main Depth (m)	Unit Rate $ / Length (m) *(presented in 2019 dollars)*	Cost Adjustment Factors *(applied to account for Acid Sulphate soils and high water table)*
160mm Gravity Main	3.0m to 4.5m	$670	2.50
250mm Gravity Main	1.5m to 3.0m	$574	2.28
250mm Gravity Main	3.0m to 4.5m	$784	2.50
250mm Gravity Main	4.5m to 6.0m	$1,138	2.63
315mm Gravity Main	3.0m to 4.5m	$777	2.50
315mm Gravity Main	4.5m to 6.0m	$1,113	2.63
400mm Gravity Main	3.0m to 4.5m	$1,089	2.50
500mm Gravity Main	3.0m to 4.5m	$1,434	2.50

Stormwater – Cost estimates were sourced from the 'Northshore Hamilton PDA Stormwater Network Analysis Review' (Cardno, Oct 2019) which utilises unit rates and project costs for certain non-standard items'. These rates are detailed in Table 9, with project costs presented for the relevant items in the Schedule of works.

The following costs have been included in calculations of the stormwater network estimates:

- Excavation
- Disposal of any existing infrastructure
- Bedding
- Stormwater Network components
- Backfill

Costs included in the main and minor channel construction/ modification estimates are:

- Dewatering/bypass provisions
- Vegetation clearing
- ESC
- Excavation
- ASS treatment
- Concrete blinding layer
- Concrete channel base where required
- Revegetation
- Water quality monitoring

Table 9—Stormwater network unit rates

Asset Description	Unit Rate $ / Length (m) or $ / item *(presented in 2019 dollars)*
375mm RCP	$190 / m
450mm RCP	$232 / m
525mm RCP	$277 / m
600mm RCP	$331 / m
750mm RCP	$419 / m
825mm RCP	$486 / m
900mm RCP	$517 / m
1,050mm RCP	$651 / m
1,200mm RCP	$671 / m
1,350mm RCP	$821 / m
1,500mm RCP	$1,156 / m
1,800mm RCP	$1,264 / m
1800x1500 RCBC	$1,500 / m
Gully Pit	$3,228 to $8,758 each (dependant on size/type)
Field Inlet	$2,797 each
Stormwater Channel revegetation	$8 / m
Mangrove Clearance from Stormwater Channel	$20 / m

Transport – Roads and pathways costs estimates were sourced from the 'Northshore Hamilton PDA – Infrastructure Analysis & Costings Report – Road Network' (Cardno, Oct 2019) which utilises both unit rates and specific costs for particular items.

Costs for future roads, intersections, and shared pathways have been determined using specific costs, as the designs and cross-sections for these assets are generally non-standard throughout the PDA. Unit rates for structures (bridges and culverts) have been bae on the unit rates listed in Table 10 below. Public transport infrastructure has been generally based on the those presented in the BCC LGIP, which have been applied at the rates identified in Table 10.

The following costs have been included in the calculation of the road cost estimates:

- Demolition / Clearing and grubbing
- Excavation & earthworks
- Pavement construction
- Off -road cycle paths, shard paths and pedestrian footpaths
- On-street parking
- Street lighting
- Signs and line marking
- Streetscape works

Table 10—Transport network unit rates

Asset Type	Unit Rate $ / Length (m), $ / m² or $ / item *(presented in 2019 dollars)*
Bridge	$7,625 / m² of deck area
Culvert	$1,815 / m
Ferry Terminal	$8,000,000 each
Bus Stop	$100,000 each

RO1 is an exception to the above costing methodology as it is not sourced from the Northshore Hamilton PDA – Infrastructure Analysis & Costings Report – Road Network. The costing of RO1 is based on contracted works delivered by EDQ in the PDA.

Parks and land for community facilities – Cost estimates were sourced from the 'Northshore Hamilton PDA Infrastructure Analysis and Costings Report – Open Space Network' (Cardno, Oct 2019) which utilises unit rates in its methodology for costing. These rates are detailed in Table 11.

The report identifies the potential for Park delivery to be staged in order to reduce the upfront costs and to meet the needs of the growing population over time. Given its size and costs, the metropolitan recreation park is to be delivered over three phases, based on the following cost assumption:

- Phase A (Year 0) – All Land and 1/3 of total embellishment costs
- Phase B (Year 5) – 1/3 of total embellishment costs
- Phase B (Year 10) – 1/3 of total embellishment costs

Additionally, there are variations in the amount of area of land used to calculate costs in the Northshore Hamilton PDA Infrastructure Analysis and Costings Report – Open Space Network report and what is included in the IPBR. The area of land included in the IPBR is derived from EDQ's GIS mapping of the parks.

Table 11—Park and land for community facilities network unit rates

Park Hierarchy	Unit Rate $ / Hectare *(presented in 2019 dollars)*
Regional Recreation Park (Metropolitan)	$3,870,000
District Sport Park	$2,380,000
Revetment Wall Works	$16,445

6.3 On-costs allowance

On-costs represent the owner's project costs and may include:

- survey for the work
- geotechnical investigations for the work
- strategic planning
- detailed design for the work

- project management, procurement and contract administration
- environmental investigations for the work, and
- portable long service leave payment for a construction contract for the work.

The on-costs allowances that have been applied to infrastructure costs in the PDA are stated in Table 12.

Table 12—On-cost allowance

Network	On-costs allowance
All Networks	13% applied to the Base Cost (inclusive of cost factors)

6.4 Contingency allowance

A contingency allowance is included in the cost of future infrastructure works to deal with known risks. The level of contingency allowance applied for infrastructure works in each network are stated in Table 13.

Table 13 - Contingency allowance

Network	Contingency allowance
All Networks	25% applied to the Base Estimate (inclusive of on-costs and cost factors)

7 Development charges

Development charges are imposed on development in the PDA to fund trunk infrastructure which have been provided or are planned to be provided to service the PDA. The following development charges apply in the PDA.

- Infrastructure charges; and
- Value uplift charge.

7.1 Infrastructure charges

The infrastructure charges fund the provision of trunk water supply, sewerage, stormwater, transport, parks and community facilities infrastructure. These charges have been determined having regard to a Schedule of Works Model to estimate future infrastructure expenditure. The model utilises a discounted cash flow (DCF) methodology to reliably model expenditure against projected revenue from infrastructure charges.

The infrastructure charges levied under the DCOP have been adjusted to align with infrastructure charge rates that are levied throughout local government areas across Queensland in accordance with the *Planning Regulation 2017*.

7.2 Value uplift charge

The value uplift charge are levied to assist in funding the provision of infrastructure identified in the DCOP required to meet the increase in development density planned for the PDA. This charge has been calculated using the following methodology:

Value uplift charges apply only to development yield exceeding that which would be allowable under the Brisbane City Plan 2000 determined in accordance with Map 2 of the DCOP. Value uplift charges are applied in addition to development charges.

The steps required to determine the value uplift charge for each relevant residential and non-residential use charge category for a development proposal is as follows:

- **Step 1** — Determining the amount of GFA allowable (allowable GFA) by multiplying the Plot Ratio in Map 2) by the site area[7] and subtracting any GFA which is existing on the site and will remain on the site when the development is complete

- **Step 2** — Determining the amount of the GFA which Value Uplift Charges are to be applied to (uplift GFA) by taking the allowable GFA away from the total GFA proposed in the development approval (total GFA).

- **Step 3** — Determining what percentage of the total GFA is to be allocated to each use type (percentage use) by dividing the GFA proposed for each land use type by the total GFA and multiplying the answer by 100.

- **Step 4** — Multiply the percentage for each use (calculated in step 3) by the uplift GFA to determine the GFA for each land use which will be subject to Value Uplift Charges (value uplift GFA).

- **Step 5** — Multiplying the value uplift GFA for each land use by the relevant Value Uplift Charge rate. Add the resulting Value Uplift Charges together.

8 Infrastructure schedules of works

Appendix F provides a schedule of future infrastructure for each network servicing the PDA.

Appendix A – Northshore Hamilton PDA Boundary Map

Appendix B - Plot ratios and GFA distribution assumptions

Table 1 – Development Scheme Plot Ratio Assumptions

Development Scheme Zone	Plot Ratio
Commercial centre	2
Community facility	0
Industrial	0.5
Mixed industry and business	2.5
Mixed use high density (sub area 1)	8
Mixed use high density (sub area 2)	4
Mixed use medium density	1.5
Open space / special purpose / sport and recreation	0

Table 2 - GFA Distribution Assumptions

Development Scheme Zone	Retail	Hotel	Bulky Goods	Commercial	Light Industrial	Education	Residential	Residential Dwelling Proportions		
								Small	Medium	Large
Commercial centre	1%	-	55%	34%	-	-	10%	35%	45%	20%
Community facility	-	-	-	-	-	-	-			
Industrial	1%	-	-	10%	89%	-	-			
Mixed industry and business	1%	-	-	90%	9%	-	-			
Mixed use high density (sub area 1)	1%	-	-	4%	-	-	95%	35%	45%	20%
Mixed use high density (sub area 2)	1%	-	-	4%	-	-	95%	35%	45%	20%
Mixed use medium density	1%	-	-	4%	-	-	95%	35%	45%	20%
Open space / special purpose / sport and recreation	-	-	-	-	-	-	-			

Table 3. Dwelling Size Assumptions

Dwelling Type	Area (m²)
Small (1 Bedroom Equivalent)	90
Medium (2 Bedroom Equivalent)	90
Large (3 Bedroom Equivalent)	90

Note: Average dwelling size adopted for all types. Refer to proportions in Table 2 above for distribution of dwelling types

Source: Based on the 'Northshore Hamilton PDA - Development Capacity Assessment (Integran, 2019)

Appendix C – Demand generation rates

Demand generation rates

Column 1 Development scheme zone / area	Column 2 Demand generation rate for an infrastructure network				
	Water supply network (EP)	Sewerage network (EP)	Stormwater quantity network (Imp Fr.)	Transport network (trips)	Parks and community facilities network (EP)
Multi-Unit Residential (per dwelling)	1.79	1.79	0.85	4.2	1.73
Commercial (Retail) (per m² GFA)	0.00648	0.00648	0.9	0.4	0.001774
Commercial (Office) (per m² GFA)	0.00648	0.00648	0.9	0.16	0.004073
Community (per m² GFA)	0.00648	0.00648	0.9	0.15	0.002062
Industrial (per m² GFA)	0.00648	0.00648	0.9	0.05	0.000635
Source	*Sewer & Water Investigation Masterplan for the Northshore Hamilton Redevelopment (Bornhorst + Ward, Nov 2018)*		*BCC LGIP Schedule 3 – SC3.1.3—Planned density and demand generation rate for a trunk infrastructure network*	*BCC LGIP - Transport Extrinsic Material - Tables 4.3.1.1 to 4.3.1.3*	*BCC LGIP - Parks Extrinsic Material - Tables 4.3.1.1 to 4.3.1.2 - assumes 1 EP per person*

Appendix D – Demand projections

The demands presented below include those generated by the existing development at the time the Priority Development Area was declared in March 2008. This is necessary to ensure that the network modelling adequately accounts for the impacts of these uses upon the infrastructure networks.

The demand projections upon which the various infrastructure planning studies informing the DCOP were based are slightly different to those presented below. The demands below are based on the Planning Assumptions detailed in the 'Northshore Hamilton PDA - Development Capacity Assessment' (Integran, 2019) which presents dwelling and floorspace projections that have since been amended to use base year July 2019 as well as reflecting the final Development Scheme outcomes. The resulting differences do not have a material impact upon the infrastructure network modelling performed.

Existing and projected demand for the water supply network

Column 1 Service catchment[1]	Column 2 Existing and projected demand (EP)					
	2019 (base date)	2021	2026	2031	2036	Ultimate development
Northshore Hamilton PDA	6,062	7,076	9,612	12,148	14,684	30,669

Notes:
1 – Refer to Appendix A PDA Boundary which defines the service catchment area

Existing and projected demand for the sewerage network

Column 1 Service catchment[1]	Column 2 Existing and projected demand (EP)					
	2019 (base date)	2021	2026	2031	2036	Ultimate development
Northshore Hamilton PDA	6,062	7,076	9,612	12,148	14,684	30,850

Notes:
1 – Refer to Appendix A PDA Boundary which defines the service catchment area

Existing and projected demand for the stormwater network

Column 1 Service catchment[1]	Column 2 Existing and projected demand (impervious hectares)					
	2019 (base date)	2021	2026	2031	2036	Ultimate development
Northshore Hamilton PDA						

Notes:
1 – Refer to Appendix A PDA Boundary which defines the service catchment area

Existing and projected demand for the transport network

Column 1 Service catchment[1]	Column 2 Existing and projected demand (trips)					
	2019 (base date)	2021	2026	2031	2036	Ultimate development
Northshore Hamilton PDA	29,699	36,480	53,433	70,386	87,338	211,808

Notes:
1 – Refer to Appendix A PDA Boundary which defines the service catchment area

Existing and projected demand for the parks and community facilities network

Column 1 Service catchment[1]		Column 2 Existing and projected demand (Persons)				
	2019 (base date)	2021	2026	2031	2036	Ultimate development
Northshore Hamilton PDA	4,978	5,886	8,157	10,427	12,697	26,364

Notes:
1 – Refer to Appendix A PDA Boundary which defines the service catchment area

Appendix E – Transport Standard of Service

Northshore Hamilton PDA Road Hierarchy
Roads in the Northshore Hamilton PDA have been classified into the following road hierarchy categories:

- Suburban road
- District road
- Neighbourhood road, and
- Local road.

The Road Hierarchy Map below identifies the applicable category for each road in the Northshore Hamilton PDA. BCC's DSS is the basis for the roads DSS in the PDA (except where varied as per the table in Section 4.4 of the Desired Standards of Service) and is to be applied in accordance with the road categories shown on the Road Hierarchy Map.

Road Hierarchy Map

Source: Nearmap, Economic Development Queensland
Map sourced from the Transport Master Plan – Northshore Hamilton PDA (Cardno, Oct 2021)

The concept road network detailed in Appendix A of the Transport Master Plan – Northshore Hamilton PDA (Cardno, Oct 2021) provides an overview of the intended road design and cross-sections throughout the PDA.

Appendix F – Schedules of works (detailed)

Schedule of future trunk infrastructure works – Water supply

DCOP ID	Map ref	Infrastructure Type	Pipe diameter (mm)	Pipe length (m)	Cost Factor	Estimated timing	Land Cost	Works Base Cost	Works On-Costs	Works Contingency	Total Works Cost[1]	Estimated Cost[2]
W01		Watermain (PE)	315	135	2.28	2022 to 2026	$0	$221,930	$28,851	$62,695	$313,476	$313,476
W02		Watermain (PE)	315	105	2.28	2027 to 2031	$0	$172,632	$22,442	$48,769	$243,843	$243,843
W03		Watermain (PE)	315	157	2.28	2027 to 2031	$0	$257,274	$33,446	$72,680	$363,399	$363,399
W04		Watermain (PE)	315	85	2.28	2027 to 2031	$0	$139,649	$18,154	$39,451	$197,255	$197,255
W05		Watermain (PE)	315	75	2.28	2027 to 2031	$0	$123,427	$16,046	$34,868	$174,341	$174,341
W06		Watermain (PE)	315	103	2.28	2027 to 2031	$0	$168,010	$21,841	$47,463	$237,314	$237,314
W07		Watermain (PE)	315	62	2.28	2027 to 2031	$0	$100,777	$13,101	$28,470	$142,348	$142,348
W08		Watermain (PE)	315	157	2.28	2027 to 2031	$0	$256,728	$33,375	$72,526	$362,628	$362,628
W09		Watermain (PE)	315	127	2.28	2019 to 2021	$0	$207,293	$26,948	$58,560	$292,802	$292,802
W10		Watermain (PE)	315	55	2.28	2019 to 2021	$0	$89,442	$11,627	$25,267	$126,337	$126,337
W11		Watermain (PE)	315	52	2.28	2019 to 2021	$0	$85,014	$11,052	$24,016	$120,082	$120,082
W12		Watermain (PE)	315	14	2.28	2019 to 2021	$0	$23,659	$3,076	$6,684	$33,418	$33,418
W13		Watermain (PE)	315	24	2.28	2019 to 2021	$0	$40,132	$5,217	$11,337	$56,687	$56,687
						TOTAL	$0	$1,885,967	$245,176	$532,786	$2,663,930	$2,663,930

Notes:

1 – The total works cost is the sum of the following: construction cost, construction on costs and construction contingency.

2 – The estimated cost is the sum of the following: land cost and total works cost. This is expressed in current cost terms as at the base date.

3 – Items identified within the 2019 to 2021 timeframe are known costs and therefore do not have on-costs or contingencies applied

Schedule of future trunk infrastructure works – Sewerage

DCOP ID	Map ref	Infrastructure Type	Pipe diameter (mm)	Pipe length (m)	Depth (m)	Cost Factor	Estimated timing	Land Cost	Works Base Cost	Works On-Costs	Works Contingency	Total Works Cost[1]	Estimated Cost[2]
S01		Gravity Main (PE)	500	76	3.4	2.5	2019 to 2021	$0	$270,902	$35,217	$76,530	$382,649	$382,649
S02		Gravity Main (PE)	500	88	3.56	2.5	2019 to 2021	$0	$315,329	$40,993	$89,080	$445,402	$445,402
S03		Gravity Main (PE)	400	131	3.52	2.5	2019 to 2021	$0	$356,284	$46,317	$100,650	$503,251	$503,251
S04		Gravity Main (PE)	400	145	3.27	2.5	2019 to 2021	$0	$394,331	$51,263	$111,398	$556,992	$556,992
S05		Gravity Main (PE)	315	147	3.51	2.5	2019 to 2021	$0	$285,829	$37,158	$80,747	$403,733	$403,733
S06		Gravity Main (PE)	315	81	3.75	2.5	2019 to 2021	$0	$157,427	$20,466	$44,473	$222,366	$222,366
S07		Gravity Main (PE)	315	75	3.63	2.5	2019 to 2021	$0	$146,420	$19,035	$41,364	$206,818	$206,818
							TOTAL	$0	$1,926,521	$250,448	$544,242	$2,721,211	$2,721,211

Notes:

1 – The total works cost is the sum of the following: construction cost, construction on costs and construction contingency.

2 – The estimated cost is the sum of the following: land cost and total works cost. This is expressed in current cost terms as at the base date.

3 – Items identified within the 2019 to 2021 timeframe are known costs and therefore do not have on-costs or contingencies applied

Schedule of future trunk infrastructure works – Stormwater

DCOP ID	Map ref	Infrastructure Type	Length (m) or Quantity	Diameter (mm)	Material	Estimated timing	Land Cost	Works Base Cost	Works On-Costs	Works Contingency	Total Works Cost[1]	Estimated Cost[2]
SW01		Stormwater Pipe	58	1350	RCP	2022 to 2026	$0	$47,876	$6,224	$13,525	$67,625	$67,625
SW02		Stormwater Pipe	82	1350	RCP	2022 to 2026	$0	$67,002	$8,710	$18,928	$94,640	$94,640
SW03		Stormwater Pipe	12	1350	RCP	2022 to 2026	$0	$10,027	$1,303	$2,832	$14,162	$14,162
SW04		Stormwater Pipe	17	1200	RCP	2022 to 2026	$0	$11,290	$1,468	$3,189	$15,947	$15,947
SW05		Stormwater Pipe	55	1200	RCP	2022 to 2026	$0	$36,667	$4,767	$10,358	$51,792	$51,792
SW06		Stormwater Pipe	109	1200	RCP	2027 to 2031	$0	$72,959	$9,485	$20,611	$103,054	$103,054
SW07		Stormwater Pipe	50	750	RCP	2027 to 2031	$0	$21,691	$2,820	$6,128	$30,639	$30,639
SW08		Stormwater Pipe	63	1500	RCP	2027 to 2031	$0	$73,069	$9,499	$20,642	$103,209	$103,209

DCOP ID	Map ref	Infrastructure Type	Length (m) or Quantity	Diameter (mm)	Material	Estimated timing	Land Cost	Works Base Cost	Works On-Costs	Works Contingency	Total Works Cost[1]	Estimated Cost[2]
SW09		Stormwater Pipe	89	1500	RCP	2027 to 2031	$0	$102,340	$13,304	$28,911	$144,555	$144,555
SW10		Stormwater Pipe	104	1500	RCP	2027 to 2031	$0	$119,697	$15,561	$33,814	$169,072	$169,072
SW11		Stormwater Pipe	70	1200	RCP	2027 to 2031	$0	$47,085	$6,121	$13,302	$66,508	$66,508
SW12		Stormwater Pipe	23	900	RCP	2027 to 2031	$0	$11,977	$1,557	$3,384	$16,918	$16,918
SW13		Stormwater Pipe	59	900	RCP	2027 to 2031	$0	$30,522	$3,968	$8,622	$43,112	$43,112
SW14		Stormwater Pit	7			2022 to 2026	$0	$52,461	$6,820	$14,820	$74,102	$74,102
SW15		Stormwater Pit	4			2027 to 2031	$0	$29,978	$3,897	$8,469	$42,344	$42,344
SW16		Stormwater Pit	2			2027 to 2031	$0	$14,989	$1,949	$4,234	$21,172	$21,172
SW17		Stormwater Pit	2			2027 to 2031	$0	$14,989	$1,949	$4,234	$21,172	$21,172
SW18		Stormwater Pit	8			2027 to 2031	$0	$59,956	$7,794	$16,938	$84,688	$84,688
						TOTAL	$0	$824,574	$107,195	$232,942	$1,164,711	$1,164,711

Notes:

1 – The total works cost is the sum of the following: construction cost, construction on costs and construction contingency.

2 – The estimated cost is the sum of the following: land cost and total works cost. This is expressed in current cost terms as at the base date

Schedule of future trunk infrastructure works - Transport

DCOP ID	Map ref	Infrastructure Type	Infrastructure Description	Estimated timing[3]	Land Cost	Works Base Cost	Works On-Costs	Works Contingency	Total Works Cost[1]	Estimated Cost[2]
I03		Unsignalised Intersection	MacArthur Ave / Cycle St / Riverfront Ln	2022 to 2026	$0	$434,740	$56,516	$122,814	$614,070	$614,070
I06		Unsignalised Intersection	MacArthur Ave / Cycle St / Riverfront Ln	2027 to 2031	$0	$547,430	$71,166	$154,649	$773,245	$773,245
I08		Unsignalised Intersection	MacArthur Ave / Cycle St / Riverfront Ln	2019 to 2021	$0	$389,095	$50,582	$109,919	$549,597	$549,597
I09		Unsignalised Intersection	MacArthur Ave / Cycle St / Riverfront Ln	2019 to 2021	$0	$367,080	$47,720	$103,700	$518,501	$518,501
R01		Road Upgrade	Remora Rd, Northshore Way and MacArthur Ave Road Project	2019 to 2021	$0	$0	$0	$0	$21,436,748	$21,436,748
R03		Road Upgrade	MacArthur Ave (between Cycle St & Brett St)	2022 to 2026	$0	$1,659,455	$215,729	$468,796	$2,343,980	$2,343,980
R04		Road Upgrade	MacArthur Ave (between Brett St & Theodore St)	2027 to 2031	$0	$1,540,715	$200,293	$435,252	$2,176,260	$2,176,260
R05		Road Upgrade	MacArthur Ave (between Brett St & Theodore St)	2027 to 2031	$0	$1,540,715	$200,293	$435,252	$2,176,260	$2,176,260
R06		Road Upgrade	MacArthur Ave (between Theodore St & Cycle St)	2027 to 2031	$0	$2,087,883	$271,425	$589,827	$2,949,134	$2,949,134

DCOP ID	Map ref	Infrastructure Type	Infrastructure Description	Estimated timing[3]	Land Cost	Works Base Cost	Works On-Costs	Works Contingency	Total Works Cost[1]	Estimated Cost[2]
R07		Road Upgrade	MacArthur Ave (between Cycle St & Cycle St)	2027 to 2031	$0	$1,688,175	$219,463	$476,909	$2,384,547	$2,384,547
R08		Road Upgrade	MacArthur Ave (between Cycle St & Cycle St)	2027 to 2031	$0	$1,711,800	$222,534	$483,584	$2,417,918	$2,417,918
R09		Road Upgrade	MacArthur Ave (between Cycle St & Cycle St)	2019 to 2021	$0	$1,569,600	$204,048	$443,412	$2,217,060	$2,217,060
R10		Road Upgrade	MacArthur Ave (between Cycle St & Angora Rd)	2019 to 2021	$888,070	$1,595,400	$207,402	$450,701	$2,253,503	$3,141,573
CP01		Shared Path	MacArthur Ave Nth Shared Path	2027 to 2031	$0	$317,550	$41,282	$89,708	$448,539	$448,539
PT01		Bus Stop	MacArthur Ave (Between Theodore St & Brett St)	2027 to 2031	$0	$100,000	$13,000	$28,250	$141,250	$141,250
PT02		Bus Stop	MacArthur Ave (Between Theodore St & Brett St)	2027 to 2031	$0	$100,000	$13,000	$28,250	$141,250	$141,250
				TOTAL	$888,070	$37,086,386	$2,034,453	$4,421,023	$44,105,114	$44,429,932

Notes:

1 – The total works cost is the sum of the following: construction cost, construction on costs and construction contingency.

2 – The estimated cost is the sum of the following: land cost and total works cost. This is expressed in current cost terms as at the base date

3 – Items identified within the 2019 to 2021 timeframe are known costs and therefore do not have on-costs or contingencies applied

Schedule of future trunk infrastructure works – Parks and Community Facilities

DCOP ID	Map ref	Infrastructure Type	Infrastructure Description	Area (m²) or Length (m)	Estimated timing[3]	Land Cost	Works Base Cost	Works On- Costs	Works Contingency	Total Works Cost[1]	Estimated Cost[2]
P02		Regional Recreation Park (Metropolitan Level)	Stage A – Land Acquisition & Partial Embellishment	7,335	2027 to 2031	$4,300,000	$946,210	$123,007	$267,304	$1,336,521	$5,636,521
P03		Regional Recreation Park (Metropolitan Level)	Stage A – Land Acquisition & Partial Embellishment	13,964	2022 to 2026	$6,579,584	$1,801,343	$234,175	$508,879	$2,544,397	$9,123,981
P03		Regional Recreation Park (Metropolitan Level)	Stage B - Partial Embellishment	13,964	2027 to 2031	$0	$1,801,343	$234,175	$508,879	$2,544,397	$2,544,397
P04		Regional Recreation Park (Metropolitan Level)	Stage A – Land Acquisition & Partial Embellishment	4,135	2022 to 2026	$2,492,296	$533,361	$69,337	$150,674	$753,372	$3,245,668
P04		Regional Recreation Park (Metropolitan Level)	Stage B - Partial Embellishment	4,135	2027 to 2031	$0	$533,361	$69,337	$150,674	$753,372	$753,372
P05		Regional Recreation Park (Metropolitan Level)	Stage A – Land Acquisition & Partial Embellishment	3,308	2022 to 2026	$2,110,000	$426,722	$55,474	$120,549	$602,744	$2,712,744
P05		Regional Recreation Park (Metropolitan Level)	Stage B - Partial Embellishment	3,308	2027 to 2031	$0	$426,722	$55,474	$120,549	$602,744	$602,744

DCOP ID	Map ref	Infrastructure Type	Infrastructure Description	Area (m²) or Length (m)	Estimated timing[3]	Land Cost	Works Base Cost	Works On- Costs	Works Contingency	Total Works Cost[1]	Estimated Cost[2]
P06		Regional Recreation Park (Metropolitan Level)	Stage A – Land Acquisition & Partial Embellishment	5,478	2027 to 2031	$3,280,000	$706,719	$91,873	$199,648	$998,240	$4,278,240
PO7		Regional Recreation Park (Metropolitan Level)	Stage A – Land Acquisition & Partial Embellishment	4,640	2027 to 2031	$2,700,000	$551,661	$82,432	$211,364	$845,457	$3,545,457
RW01		Revetment Wall	Frontage to Park P02	120	2027 to 2031	$0	$1,898,765	$246,839	$536,401	$2,682,006	$2,682,006
RW02		Revetment Wall	Frontage to Park P04	120	2022 to 2026	$0	$1,883,253	$244,823	$532,019	$2,660,095	$2,660,095
RW03		Revetment Wall	Frontage to Park P05	150	2022 to 2026	$0	$2,316,890	$301,196	$654,522	$3,272,608	$3,272,608
RW04		Revetment Wall	Frontage to Park P06	160	2027 to 2031	$0	$2,716,826	$353,187	$767,503	$3,837,517	$3,837,517
RW05		Revetment Wall	Frontage to Park P07	150	2027 to 2031	$0	$2,452,263	$318,794	$692,764	$3,463,821	$3,463,821
					TOTAL	$21,461,880	$19,092,151	$2,492,695	$5,449,050	$26,897,292	$48,359,172

Notes:

1 – The total works cost is the sum of the following: construction cost, construction on costs and construction contingency.

2 – The estimated cost is the sum of the following: land cost and total works cost. This is expressed in current cost terms as at the base date.

3 – Items identified within the 2019 to 2021 timeframe are known costs and therefore do not have on-costs or contingencies applied.

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