



**March 2018**

**Western Australia Department of Planning**

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**Wanju – Staging Plan**

Revision 3.0

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## Document Control

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2.1	21/03/17	<i>Scenario Amendments</i>	SJB	JN
2.2	26/04/17	<i>Minor Amendments</i>	SJB	SAB
3.0	26/03/18	<i>Scenario Amendments</i>	SJB	SAB

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## 1.0 Executive Summary

Following the preparation and public consultation of the Draft Wanju District Structure Plan (DSP) in 2016 by the Western Australian Department of Planning and the Shire of Dardanup, it is logical to analyse the land use outcomes in the DSP to progress the detailed investigation of infrastructure required to service the plan. The Servicing Needs Investigation initiated this process by identifying the potential scope of development infrastructure required for the Wanju DSP and possible funding frameworks to manage its delivery.

This staging plan will allow for satisfaction of the initial recommendations of the Servicing Needs Investigation by setting out potential options for logical, efficient and effective roll-out of development and infrastructure at Wanju for the lifetime of the development project.

The following report will outline the assumptions and processes used in the Staging Plan preparation and provides justification to support the sequencing options proposed.

The outcomes of the Staging Plan when refined and finalised will form the basis for the network planning by all infrastructure providers to the DSP, to provide a consistent platform upon which to determine the most efficient and cost effective approach to servicing the Development.

In the lead up to development of Wanju the following key steps are envisaged to provide higher levels of certainty as to the requirements and costs to develop the Wanju District Structure Plan Area. This will ultimately result in the development of the Development Contribution Plan (DCP) by the Shire of Dardanup, and other supporting infrastructure frameworks (such as those relating to other infrastructure authorities), to provide clarity, certainty, transparency and equity in the delivery of the development.

### Phase 1 – Staging, Demands and Infrastructure Concept Planning

1. Draft Staging Plan – Discussion Draft – **Completed**
2. Refinement and Finalisation of Staging Plan – **Current Scope**
3. Infrastructure Planning for both Options by all network providers
4. Review/refinement of staging in light of infrastructure solutions including any live initial development enquiries or options that articulate lead-in works and associated costs

### Phase 2 – DCP Preparation

5. Refinement of costing, timing, and Apportionment Modelling for all Networks
6. Draft DCP including Contribution Rates, Schedule of Infrastructure and Cost, mapping of all assets.
7. Adoption of DCP to support District Structure Plan

### Phase 3 – Review and Refinement upon commitment to Development

8. Receipt and processing of First Local Structure Plans
9. Refinement and Adjustment to DCP timing and infrastructure given better detail
10. Approvals and Development

## 2.0 Workshop Feedback

An industry workshop was held in December 2016 to present a draft staging plan and allow service providers to raise any issues which they felt would need to be addressed as part of this report. This was followed up by a questionnaire sent to all participants, in order to better understand their position. **Appendix B** provides a brief summary of the workshop dates, attendees, and matters discussed.

Feedback received directly from the workshop identified the need to include a growth scenario where conservative densities were applied, and this additional option has been incorporated into this revision of the report.

### 2.1 Questionnaire Responses

Following a workshop with service providers, a questionnaire was provided to encourage feedback. Responses that were received have been summarised in Table 2.1. Requests for additional information have been addressed further in Table 2.2.

Table 2.1. Questionnaire Summary

Question	Option	Response	Comment
Is your organisation willing to participate in the trunk infrastructure network planning and costing as part of the general DCP planning process?	Yes	7	
	No	2	
	Not Answered	0	
Which planning approach are you most happy to work within?	a) A facilitated rapid strategic planning and costing approach to define future trunk networks (charrette style)	0	
	b) Broad based planning in-house based on current knowledge and the staging plan	2	
	c) Detailed network modelling based on the demand inputs	0	
	d) A blend of a) and b)	3	
	e) Other Approach	1	
	Not Answered	3	
Is the staging plan sufficient to start the infrastructure planning process?	Yes	0	
	No - More information required	5	
	Not Answered	4	
What Additional Information is required?		3	See Table 2.2
Do you agree with service catchment based planning and cost apportionment to determine developer contributions?	Yes	6	
	No	0	
	Not answered	3	
Do you agree with planning Wanju and Waterloo infrastructure networks concurrently?	Yes	6	
	No	0	
	Not answered	3	

The general assumptions that can be drawn from the responses is that more needs to be done with particular agencies to work on strategic planning and the benefits that can flow from the

process. It was clear from a personal or policy perspective of some agencies that little or no value or weight of the process has been determined. It is likely that such benefits will not be realised until the first iteration of the infrastructure planning has been realised along with the potential revenue streams that could flow. Notwithstanding the lack of some response, of those that did there was general support for the approach provided in the draft Wanju Staging Plan and Servicing Needs Investigation report.

Table 2.2. Additional information required for infrastructure planning

Additional Information Required	Comment/Response
Fully scheduled demands by 'super-lot'	This has now been provided for all four scenarios in appendix A and within the GIS tables
Site investigations required to determine suitability for building sites, including contours, drainage and road access	<ul style="list-style-type: none"> <li>• Contours are available from the planning team and the work done by DoW on the drainage.</li> <li>• LiDAR for the general Wanju and Waterloo area is available. This data can be provided by Department of Water Spatial Services and GIS Section.</li> <li>• GIS drainage data will be finalised as part of the Drainage and Water Management Plan (DWMP) by DoW.</li> <li>• Ultimate road access arrangements as per the Wanju DSP documents (GIS layers are available from WA DOP)</li> </ul>
GIS table sets	GIS tables have been provided for all scenarios

GIS tables of the population modelling is now available for the following scenarios:

- Southern Development Front - High Growth
- Southern Development Front - Moderate Growth

A summary of modelling outputs by superlot is provided in **Appendix C**, while details of the inclusions within the GIS tables is provided in **Appendix D**.

## 3.0 Population and Gross Floor Area (GFA) Modelling

### 3.1 Modelling Assumptions

The assumptions made for the purposes of modelling population and non-residential growth have been outlined below.

#### Residential Density

Residential density has been determined based on advice from Western Australian Department of Planning (DoP). The high density scenario is based on ultimate development of land designations set out in the DSP. The density assumptions comprise the following determinations:

Table 3.1. Dwelling Density per Hectare by Zone

Zone	% Excl. Services, Open Space, Roads etc.*	Development Density	
		Gross Density (dw/ha)	Resultant Nett Density (dw/ha)
Medium Density	25%	37	49
Mixed Use	25%	15	20
Commercial	25%	0	0

\*This constraint accounts for areas required for infrastructure at the detailed planning level that are in addition to those already excluded for infrastructure purposes under the District Structure Plan.

#### Household Size

The potential average household size for Wanju has been estimated by WA DoP, based on the type of housing product anticipated within each zone. It was not considered necessary to undertake the modelling using changing occupancy rates over time, rather an ultimate overall average household size has been assumed. These are outlined in the table below.

Table 3.2. Household Size by Zone

Zone	Household Size (persons)
Medium Density	2.7
Mixed Use	2.1
Commercial	0

#### Non-Residential GFA

Growth in non-residential demand is expressed in square metres of Gross Floor Area (GFA), being a measure of the sum of floor areas for all buildings and storeys being used for non-residential purposes. The GFA for sites is derived by applying site constraint factors and site cover ratios to determine the likely floor plates.

For the modelling purposes, it has been assumed that the ground floor of all development within the Mixed Use zones will comprise non-residential development, with a 50/50 split applied between commercial and retail. This assumption reflects an averaged non-residential usage, giving consideration to the fact that some sites are anticipated to be all residential, while others may include multi-storey non-residential.

GFA calculations for both Mixed Use and Commercial zones assume a 25% exclusion for the provisions of services (roads, open space etc.), and an average site cover of 50%.

Commercial zones assume that GFA will apply to an average building height of 3 storeys, while Mixed Use zones assume non-residential GFA on the ground floor only.

### Base Population

Given the ‘greenfield’ nature of the Wanju development, the base population has been assumed to be zero, which is reflective of the demand on future urban infrastructure from the current negligible population.

### Population Growth

Population growth has been determined based on figures provided by WA DoP, which identify a potential uptake of 450 to 600 dwellings per year (from year 5 and beyond) as outlined in Table 3.3 below. The overall aim of this staging plan exercise is to emulate a logical development sequence which informs the assessment of the servicing triggers and necessary infrastructure requirements. Whilst the timing of development is important, this will ultimately be determined by the speed of development and is not a major contributing factor to the network outcomes in this initial planning exercise.

Table 3.3. Dwelling Growth Rate

	Year 1	Year 2	Year 3	Year 4	Year 5+
<i>Dwelling Growth – High Growth Scenario</i>	100	200	300	500	600
<i>Dwelling Growth – Moderate Growth Scenario</i>	75	150	225	375	450

## 3.2 Development Phases and Constraints

Sequencing for the development phases of the southern development front has been determined based on feedback received from Western Australia Department of Planning and those service providers consulted during the development of the Wanju Servicing Needs Investigation (SNI) report in 2016.

Within each **Precinct**, a series of **Stages** (generally between 20-60ha) have been identified, with a staging order established based on known constraints/conditions, identifying areas likely to develop first. Particular consideration has been given to:

- Accessibility, including location of roads, drainage, and property ownership;
- Known or predicted lead-in Infrastructure servicing requirements and
- Proximity to previous development stages.

Development within the smaller areas of developable land bounded by roads and open space corridors, identified as **Superlots** with an average size of 14ha, have been assumed to develop in a logical order based on the assumptions below:

- Earlier Phases and Stages of development will see a higher propensity of residential product, rather than mixed use and commercial developments;
- Higher density developments will increase uptake as centre zones become established;
- Areas closer to previous development have a higher propensity to develop first given logical proximity and construction staging; and
- Areas closer to major roads and existing infrastructure have a higher propensity to develop first given connectivity and cost management of road construction.



While not all of these assumptions may hold true, it is considered reasonable at this stage without any prospect of a development party controlling or owning land to rely upon these factors in determining the staging. Upon the first Local Structure Plan being lodged, such assumptions can be further refined and sequencing revisited.

Table 3.4 below identifies how the proposed development scenario supports the principles and guidelines set out within the draft Wanju DSP document. Considerations for the roll-out of the initial stages of the Wanju Development have been presented in Appendix A - Map WDCP\_02.

Table 3.4. Draft Wanju DSP development principles

Draft Wanju DSP Principles	Proposed Development Staging
Efficient & effective provision of reticulated service infrastructure	Development will occur using logical extension of reticulated infrastructure to the nearest appropriately sized servicing point on the network. This will vary for the various infrastructure networks and is a critical reason to ensure the aggregated cost of these trunk lead-in works are quantified. Staging will progress from these take off points and system augmentations required in the main network will be required in a timely and efficient manner to provide sufficient capacity.
Access and connectivity to the strategic highway network	The proposed staging can be accessed via Hynes Rd and the South Western Highway using current road accesses, minimising initial requirements for connecting arterial roads. Development into precinct 2 can also be gained via the South Western Highway, which eliminates any early requirements to provide road structures over Millars creek.
Drainage Infrastructure	<p>The efficient development of Wanju will be predicated on the ability to provide timely and adequately sized 'lawful points of discharge'. This is best achieved by the establishment of easements or road reserves as required by the District Water Management Strategy up front in the development process. Beyond that temporary works will be required to provide drainage solutions and this will add cost and may sterilise land if 'right of way' cannot be established. This is a key risk to the process.</p> <p>Early stages of the proposed development staging are adjacent to a natural waterway (Millars Creek), minimising requirement to acquire additional land for stormwater drainage from other landholders during early stages of development</p>
Consideration for subsequent stages	Logical progression of development is likely to provide connectivity to recent stages of development infrastructure (particularly drainage and transport) will minimise the need to require temporary works, long run assets and premature land acquisitions

The methodology is built on three levels of sequencing being:

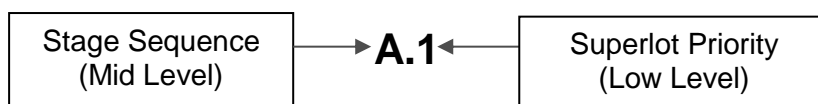
1. Precinct – large scale
2. Stage - mid scale; and
3. Superlot Priority – low scale.

A Precinct contains numerous stages and a stage contains numerous Superlot priorities.

- Precinct's are identified on the map legend and are approximately 100-200 ha each;
- Stages are labelled in alphabetical order and are between 20-60 ha in size
- Superlot Priorities are numbered under a Stage (refer below) and they are in the order of 14 ha.

The development sequencing Precincts and Superlots are identified in Appendix A - Map WDCP\_01.

Labelling of the staging maps incorporates two (2) numbers, which represent development priorities within each precinct by indicating the stage then priority as follows:



Based on the labelling identified above, priority within each precinct will be as follows:

- A.1, A.2, A.3; then
- B.1, B.2, B.3 etc

Please note that within each stage, growth will be applied across all parcels of land, but distribution will be weighted based on the assigned priority levels. (i.e. larger proportion of growth allocated to land with a higher priority).

### 3.3 *Methodology*

#### **Ultimate Development**

An ultimate population has been assumed and allocated throughout the Wanju area, based on the dwelling density and household size assumptions previously identified.

#### **Interim Growth Allocation**

Dwelling growth in the interim periods will be allocated using a gravity model, and is informed by the expected development staging identified through discussions with the Western Australia Department of Planning. Growth is restricted to the applicable stage until a pre-determined capacity of 75% is exceeded, at which point the model allows take-up in the subsequent stage/s.

Non-residential growth in the interim periods will be generally aligned with the population growth, however this has a 'lumpier' growth profile due to the occurrence of large retail shops (e.g. a 6,000m<sup>2</sup> supermarket) developing at a single point in time.

Mapping identifying the growth timing under both growth scenarios is provided in **Appendix A**.

## 4.0 Model Outputs

Based on the assumptions and methodology outlined above, Table 4.1 outlines the resulting ultimate development yields.

Table 4.1. Ultimate Development Yields

DSP Precinct	Total No. of Dwellings	Total Population	Non-residential GFA (m <sup>2</sup> )
<i>Precinct 1</i>	5,664	13,593	57,440
<i>Precinct 2</i>	2,890	6,936	12,022
<i>Precinct 3</i>	3,536	8,486	13,201
<i>Precinct 4</i>	3,252	7,804	22,005
<i>Precinct 5</i>	3,166	7,598	26,459
<i>Precinct 6</i>	3,179	7,629	74,253
<b>Total</b>	<b>21,686</b>	<b>52,047</b>	<b>205,380</b>

Ultimate development is anticipated to be achieved over a 40 year development horizon in the high growth scenario, and a 50 year development horizon in the moderate growth scenario. Tables 4.2-4.5 below identify outputs for the proposed development front under high and moderate growth scenarios, keeping in mind that these are preliminary in nature, and will require additional refinement following confirmation of the projection and staging assumptions above, and ongoing input provided by Western Australia Department of Planning and other service providers. This will also need refinement upon the first Local Structure Plan being lodged. Growth tables under all scenarios by superlot ID are provided in **Appendix C**, and within the available GIS data.

Table 4.2. High Growth Yield Scenario – Preliminary Interim Dwelling Allocations

DSP Precinct	Yr 1	Yr 3	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 40	Ult
<i>Precinct 1</i>	100	600	1,700	3,604	4,418	4,655	4,697	4,698	5,664	5,664
<i>Precinct 2</i>	0	0	0	1,096	1,990	2,653	2,882	2,890	2,890	2,890
<i>Precinct 3</i>	0	0	0	0	1,292	3,011	3,519	3,535	3,536	3,536
<i>Precinct 4</i>	0	0	0	0	0	381	2,379	3,185	3,252	3,252
<i>Precinct 5</i>	0	0	0	0	0	0	224	2,333	3,166	3,166
<i>Precinct 6</i>	0	0	0	0	0	0	0	60	3,179	3,179
<b>Total</b>	<b>100</b>	<b>600</b>	<b>1,700</b>	<b>4,700</b>	<b>7,700</b>	<b>10,700</b>	<b>13,700</b>	<b>16,700</b>	<b>21,686</b>	<b>21,686</b>

Table 4.3. Moderate Growth Yield Scenario – Preliminary Interim Dwelling Allocations

DSP Precinct	Yr 1	Yr 3	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 40	Yr 50	Ult
<i>Precinct 1</i>	75	450	1,275	3,525	4,502	4,651	4,692	4,697	4,698	5,664	5,664
<i>Precinct 2</i>	0	0	0	0	1,273	2,500	2,839	2,885	2,890	2,890	2,890
<i>Precinct 3</i>	0	0	0	0	0	874	2,544	3,432	3,533	3,536	3,536
<i>Precinct 4</i>	0	0	0	0	0	0	200	1,403	3,199	3,252	3,252
<i>Precinct 5</i>	0	0	0	0	0	0	0	107	2,415	3,166	3,166
<i>Precinct 6</i>	0	0	0	0	0	0	0	0	290	3,179	3,179
<b>Total</b>	<b>75</b>	<b>450</b>	<b>1,275</b>	<b>3,525</b>	<b>5,775</b>	<b>8,025</b>	<b>10,275</b>	<b>12,525</b>	<b>17,025</b>	<b>21,686</b>	<b>21,686</b>

Table 4.4. High Growth Yield Scenario – Preliminary Interim GFA Allocations (m<sup>2</sup>)

DSP Precinct	Yr 1	Yr 3	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 40	Yr 50	Ult
Precinct 1	1,000	4,000	8,000	18,451	33,798	46,104	49,836	49,838	51,224	57,440	57,440
Precinct 2	0	0	0	1,549	6,202	10,518	11,850	11,977	12,018	12,022	12,022
Precinct 3	0	0	0	0	0	3,379	9,711	12,283	13,120	13,201	13,201
Precinct 4	0	0	0	0	0	0	7,793	16,171	21,488	22,005	22,005
Precinct 5	0	0	0	0	0	0	810	10,947	24,036	26,459	26,459
Precinct 6	0	0	0	0	0	0	0	3,784	33,113	74,253	74,253
<b>Total</b>	<b>1,000</b>	<b>4,000</b>	<b>8,000</b>	<b>20,000</b>	<b>40,000</b>	<b>60,000</b>	<b>80,000</b>	<b>105,000</b>	<b>155,000</b>	<b>205,380</b>	<b>205,380</b>

Table 4.5. Moderate Growth Yield Scenario – Preliminary Interim GFA Allocations (m<sup>2</sup>)

DSP Precinct	Yr 1	Yr 3	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 40	Yr 50	Ult
Precinct 1	750	3,000	6,000	15,000	25,246	35,787	44,868	49,817	50,298	51,634	57,440
Precinct 2	0	0	0	0	4,754	9,213	12,122	12,031	12,023	12,022	12,022
Precinct 3	0	0	0	0	0	0	3,010	10,908	13,103	13,194	13,201
Precinct 4	0	0	0	0	0	0	0	5,993	21,323	21,953	22,005
Precinct 5	0	0	0	0	0	0	0	0	17,045	25,747	26,459
Precinct 6	0	0	0	0	0	0	0	0	2,458	41,700	74,253
<b>Total</b>	<b>750</b>	<b>3,000</b>	<b>6,000</b>	<b>15,000</b>	<b>30,000</b>	<b>45,000</b>	<b>60,000</b>	<b>78,750</b>	<b>116,250</b>	<b>166,250</b>	<b>205,380</b>

## 5.0 Recommendations

### 5.1 Infrastructure Provider Feedback

When reviewing the staging options in consideration of infrastructure planning and delivery, it is important to focus on the demand being generated and the necessary infrastructure requirements for each stage, rather than the timings identified. While this may play into some staging arrangements, the primary purpose of staging plans is to emulate a logical development sequence in order to identify the necessary servicing triggers. The actual timing of each stage of development will be driven by development interests, and while important, it will not be a major determinant of the final network outcomes for this initial planning exercise. These staging arrangements will be refined upon detailed information.

Refinement of the timings will be undertaken prior to finalisation for the staging plan based on feedback, again once the first development parties are present, and the Local Structure Plans are developed to inform the process.

Review of the proposed stages and ultimate development yields will consider the necessary demand metrics which will be used to inform the ultimate servicing requirements for the DCP area, and the trigger points which will require significant infrastructure works/investment.

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## Appendix A – Staging Maps

## Appendix B - Workshop Details

### Workshop Information

Date	1 <sup>st</sup> December 2016
Location	Gordon Stephenson House, 140 William St, Perth

### Workshop Attendees

Organisation	Name
Aqwest	Gary Hallsworth
Integran	Jason Natoli
Landcorp	Matthew Whyte
Landcorp	Suzanne Woolhouse
Main Roads Western Australia	Owen McLean
Shire of Dardanup	Mark Chester
Water Corporation	Peter Howard
Water Corporation	Mick Irving
Water West	Robert Breden
Western Australia Department of Education	Mal Parr
Western Australia Department of Health	David Jones
Western Australia Department of Housing	Will Carol
Western Australia Department of Planning	Tim Richings
Western Australia Department of Planning	Brod Meredith
Western Australia Department of State Development	Jamie Brady
Western Australia Department of Water	Ursula Kretzer
Western Australia Department of Water	Krishna Seewraj
Western Power	Neil Chivers

### Workshop agenda

Agenda	Description
Scope of Works	Overview of Integran's scope of works for the Servicing Needs Assessment and Wanju Staging Plan
Identified barriers/risks	Summary of significant identified development barriers or risks
Current infrastructure planning and delivery approach	Summary of current stand-alone approach to assessment of servicing needs within a DSP
Draft DCP - Integrated Approach	Summary of proposed integrated approach to the DCP process
Asset Lifecycle	Summary of asset planning and management lifecycle
Draft Wanju staging plan	Identification of the key assumptions and methodologies used in the Wanju staging plan
<b>Recommendations from servicing needs investigation</b>	
Boundary	Single boundary proposed for Wanju and Waterloo development
Common planning approach	Encourage service providers to participate in the development of draft DCP
Development phasing	Development phasing to be used as the basis for planning of infrastructure
Apportionment basis	Apportionment of infrastructure costs based on known demand metrics for each network
Apportionment method	Contributions to be apportioned using standard apportionment units, on a user pays method, modelled using net present value (NPV) method
Payment timing	Contributions to be paid at plan clearance (subdivision) or certificate of classification (consent uses)
Principles to determine DCP infrastructure	Service providers to refer to SPP 3.6
Aligned costing methodology	Aligned process for costing infrastructure to inform the DCP
Working group	Key service provider contacts nominated as representative to stakeholders
Annual review	Annual reviews to focus on cost and demand assumptions within DCP
Change management	Implement systems and processes to streamline DCP review and implementation

## Appendix C – Growth Tables by Superlot ID

### Residential Development (dwellings) by Superlot ID – High Growth Scenario

SuperLot ID	Yr 1	Yr 3	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 35	Yr 40 (Ultimate)
1	3	16	151	448	535	561	565	565	565	565
2	4	46	190	511	688	739	748	749	749	749
3	0	0	0	0	0	0	0	0	0	0
4	33	169	360	559	617	634	637	637	637	637
5	24	124	265	411	453	466	468	468	468	468
6	29	148	316	490	541	556	559	559	559	559
7	4	50	206	553	745	801	811	811	811	811
8	0	2	20	114	141	149	150	150	150	150
9	3	33	136	366	493	530	536	536	536	536
10	0	0	0	0	0	0	0	0	89	179
11	0	0	0	0	0	0	0	0	135	270
12	0	0	0	0	0	0	0	0	53	107
13	0	0	0	0	0	0	0	0	145	290
14	0	0	0	0	0	0	0	0	60	120
15	0	0	0	0	0	0	0	0	0	0
16	0	0	0	177	228	243	246	246	246	246
17	0	0	0	180	372	482	501	502	502	502
18	0	0	0	170	352	456	474	475	475	475
19	0	0	0	412	533	568	574	575	575	575
20	0	0	0	86	278	496	597	600	600	600
21	0	0	0	71	228	407	490	492	492	493
22	0	0	0	0	368	475	494	494	494	494
23	0	0	0	0	413	533	554	554	554	555
24	0	0	0	0	108	263	290	291	291	291
25	0	0	0	0	24	216	323	326	326	326
26	0	0	0	0	142	613	756	760	760	761
27	0	0	0	0	176	764	941	947	947	947
28	0	0	0	0	60	146	162	162	162	162
29	0	0	0	0	0	250	961	983	984	985
30	0	0	0	0	0	70	988	1,601	1,626	1,652
31	0	0	0	0	0	19	269	435	442	449
32	0	0	0	0	0	42	162	166	166	166
33	0	0	0	0	0	0	0	294	374	455
34	0	0	0	0	0	0	0	64	119	174
35	0	0	0	0	0	0	151	493	508	522
36	0	0	0	0	0	0	22	71	73	75
37	0	0	0	0	0	0	26	431	487	542
38	0	0	0	0	0	0	24	399	450	502
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	579	737	896
41	0	0	0	0	0	0	0	0	278	556
42	0	0	0	0	0	0	0	0	267	535
43	0	0	0	0	0	0	0	60	357	653
44	0	0	0	0	0	0	0	0	185	370
45	0	0	0	0	0	0	0	0	246	493
46	0	0	0	0	0	0	0	0	163	326
47	0	0	0	0	0	0	0	0	58	117
48	0	0	0	0	0	0	0	0	65	130
49	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
51	1	14	57	152	205	220	223	223	223	223
<b>Total</b>	<b>100</b>	<b>600</b>	<b>1,700</b>	<b>4,700</b>	<b>7,700</b>	<b>10,700</b>	<b>13,700</b>	<b>16,700</b>	<b>19,193</b>	<b>21,686</b>

**Residential Development (dwellings) by Superlot ID - Moderate Growth Scenario**

SuperLot ID	Yr 1	Yr 3	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 35	Yr 40	Yr 45	Yr 50 (Ultimate)
1	0	13	81	443	545	560	565	565	565	565	565	565
2	0	0	77	479	704	738	747	748	748	749	749	749
3	0	0	0	0	0	0	0	0	0	0	0	0
4	29	167	362	568	625	634	637	637	637	637	637	637
5	21	123	266	417	460	466	468	468	468	468	468	468
6	25	147	317	498	549	556	558	559	559	559	559	559
7	0	0	84	519	762	799	810	811	811	811	811	811
8	0	0	9	115	144	149	150	150	150	150	150	150
9	0	0	55	343	504	528	535	536	536	536	536	536
10	0	0	0	0	0	0	0	0	0	0	89	179
11	0	0	0	0	0	0	0	0	0	0	135	270
12	0	0	0	0	0	0	0	0	0	0	53	107
13	0	0	0	0	0	0	0	0	0	0	145	290
14	0	0	0	0	0	0	0	0	0	0	60	120
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	205	236	245	246	246	246	246	246
17	0	0	0	0	209	431	493	501	502	502	502	502
18	0	0	0	0	198	408	466	474	474	475	475	475
19	0	0	0	0	479	551	572	574	574	575	575	575
20	0	0	0	0	100	480	585	599	600	600	600	600
21	0	0	0	0	82	394	480	491	492	493	493	493
22	0	0	0	0	0	225	459	491	492	494	494	494
23	0	0	0	0	0	252	515	550	552	554	554	555
24	0	0	0	0	0	88	265	288	290	291	291	291
25	0	0	0	0	0	0	142	307	316	326	326	326
26	0	0	0	0	0	115	452	729	744	760	760	761
27	0	0	0	0	0	144	563	907	927	946	947	947
28	0	0	0	0	0	49	147	160	161	162	162	162
29	0	0	0	0	0	0	171	718	848	977	981	985
30	0	0	0	0	0	0	0	444	1,031	1,617	1,634	1,652
31	0	0	0	0	0	0	0	121	280	440	445	449
32	0	0	0	0	0	0	29	121	143	165	165	166
33	0	0	0	0	0	0	0	0	155	309	382	455
34	0	0	0	0	0	0	0	0	51	102	138	174
35	0	0	0	0	0	0	0	93	302	510	516	522
36	0	0	0	0	0	0	0	14	44	74	75	75
37	0	0	0	0	0	0	0	0	211	421	482	542
38	0	0	0	0	0	0	0	0	195	390	446	502
39	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	305	609	752	896
41	0	0	0	0	0	0	0	0	0	0	278	556
42	0	0	0	0	0	0	0	0	26	52	293	535
43	0	0	0	0	0	0	0	0	95	190	421	653
44	0	0	0	0	0	0	0	0	0	0	185	370
45	0	0	0	0	0	0	0	0	24	48	270	493
46	0	0	0	0	0	0	0	0	0	0	163	326
47	0	0	0	0	0	0	0	0	0	0	58	117
48	0	0	0	0	0	0	0	0	0	0	65	130
49	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	23	143	210	220	223	223	223	223	223	223
<b>Total</b>	<b>75</b>	<b>450</b>	<b>1,275</b>	<b>3,525</b>	<b>5,775</b>	<b>8,025</b>	<b>10,275</b>	<b>12,525</b>	<b>14,775</b>	<b>17,025</b>	<b>19,356</b>	<b>21,686</b>



### Non-Residential Development (GFA) by Superlot ID – High Growth Scenario

SuperLot ID	Yr 1	Yr 3	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 35	Yr 40	Yr 45	Yr 50 (Ultimate)
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	463	1,370	2,432	4,676	5,777	5,906	5,914	5,915	5,915	5,916	5,916	5,916
6	537	1,590	2,822	5,427	6,705	6,854	6,865	6,866	6,866	6,866	6,866	6,866
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	1,041	2,746	8,348	21,316	33,344	37,057	37,057	37,101	37,144	37,341	37,538
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	128	255	828	1,401
13	0	0	0	0	0	0	0	0	521	1,043	3,381	5,720
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	882	3,531	5,988	6,746	6,819	6,831	6,842	6,844	6,845
18	0	0	0	667	2,671	4,530	5,103	5,158	5,167	5,176	5,177	5,178
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	1,854	5,051	6,243	6,437	6,631	6,650	6,668
23	0	0	0	0	0	1,379	3,756	4,642	4,786	4,931	4,945	4,959
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	146	904	1,398	1,478	1,558	1,566	1,574
27	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	4,637	9,621	11,203	12,785	12,939	13,092
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	3,156	6,550	7,626	8,703	8,808	8,912
33	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	361	3,811	5,795	7,779	7,971	8,164
36	0	0	0	0	0	0	449	4,730	7,192	9,654	9,893	10,132
37	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	2,406	4,505	6,604	7,384	8,163
39	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	1,540	3,079	8,297	13,514
45	0	0	0	0	0	0	0	3,784	7,085	10,386	11,612	12,838
46	0	0	0	0	0	0	0	0	5,424	10,848	18,648	26,448
47	0	0	0	0	0	0	0	0	4,400	8,799	15,126	21,453
48	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1,000</b>	<b>4,000</b>	<b>8,000</b>	<b>20,000</b>	<b>40,000</b>	<b>60,000</b>	<b>80,000</b>	<b>105,000</b>	<b>130,000</b>	<b>155,000</b>	<b>180,190</b>	<b>205,380</b>

**Non-Residential Development (GFA) by Superlot ID - Moderate Growth Scenario**

SuperLot ID	Yr 1	Yr 3	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 35	Yr 40	Yr 45	Yr 50	Yr 60 (Ultimate)
1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0
5	347	988	1,572	4,356	5,590	5,856	5,918	5,916	5,916	5,916	5,916	5,916	5,916
6	403	1,147	1,825	5,056	6,487	6,797	6,868	6,866	6,866	6,866	6,866	6,866	6,866
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	865	2,603	5,588	13,169	23,134	32,082	37,035	37,276	37,516	37,526	37,536	37,538
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	129	259	1,401
13	0	0	0	0	0	0	0	0	0	0	529	1,057	5,720
14	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	2,707	5,245	6,901	6,850	6,847	6,845	6,845	6,845	6,845
18	0	0	0	0	2,047	3,968	5,220	5,182	5,180	5,178	5,178	5,178	5,178
19	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	1,726	5,764	6,197	6,630	6,648	6,666	6,668
23	0	0	0	0	0	0	1,284	4,286	4,608	4,930	4,943	4,956	4,959
24	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	857	1,200	1,543	1,557	1,571	1,574
27	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	3,566	8,126	12,687	12,874	13,062	13,092
30	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	2,427	5,532	8,636	8,764	8,891	8,912
33	0	0	0	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	2,931	5,862	6,926	7,990	8,164
36	0	0	0	0	0	0	0	0	3,638	7,275	8,596	9,916	10,132
37	0	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	1,954	3,908	5,875	7,842	8,163
39	0	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0	2,498	4,997	13,514
45	0	0	0	0	0	0	0	0	1,229	2,458	6,296	10,135	12,838
46	0	0	0	0	0	0	0	0	0	0	7,335	14,669	26,448
47	0	0	0	0	0	0	0	0	0	0	5,950	11,899	21,453
48	0	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>750</b>	<b>3,000</b>	<b>6,000</b>	<b>15,000</b>	<b>30,000</b>	<b>45,000</b>	<b>60,000</b>	<b>78,750</b>	<b>97,500</b>	<b>116,250</b>	<b>141,250</b>	<b>166,250</b>	<b>205,380</b>

## Appendix D - GIS Table Structure

The following table structure applies for tables in all scenarios

	Field Name	Field Type	Field Description
Planning Information	<b>SUPERLOT_ID</b>	Char (10)	Superlot ID
	<b>PRECINCT</b>	Char (20)	Precinct Number
	<b>STAGE</b>	Char (10)	Development Stage
	<b>PRIORITY</b>	Char (10)	Development priority - Weighted impact on the propensity to develop within each phase
Population Spatial Model	<b>DW_BASE</b>	Float	Dwellings as at year 0
	<b>DW_1</b>	Float	Dwellings as at year 1
	<b>DW_3</b>	Float	Dwellings as at year 3
	<b>DW_5</b>	Float	Dwellings as at year 5
	<b>DW_10</b>	Float	Dwellings as at year 10
	<b>DW_15</b>	Float	Dwellings as at year 15
	<b>DW_20</b>	Float	Dwellings as at year 20
	<b>DW_25</b>	Float	Dwellings as at year 25
	<b>DW_30</b>	Float	Dwellings as at year 30
	<b>DW_35</b>	Float	Dwellings as at year 35
	<b>DW_40</b>	Float	Dwellings as at year 40
	<b>DW_45</b>	Float	Dwellings as at year 45
	<b>DW_50</b>	Float	Dwellings as at year 50
	<b>DW_ULT</b>	Float	Dwellings as at Ultimate
	<b>POP_BASE</b>	Float	Population as at year 0
	<b>POP_1</b>	Float	Population as at year 1
	<b>POP_3</b>	Float	Population as at year 3
	<b>POP_5</b>	Float	Population as at year 5
	<b>POP_10</b>	Float	Population as at year 10
	<b>POP_15</b>	Float	Population as at year 15
	<b>POP_20</b>	Float	Population as at year 20
	<b>POP_25</b>	Float	Population as at year 25
	<b>POP_30</b>	Float	Population as at year 30
	<b>POP_35</b>	Float	Population as at year 35
	<b>POP_40</b>	Float	Population as at year 40
	<b>POP_45</b>	Float	Population as at year 45
	<b>POP_50</b>	Float	Population as at year 50
	<b>POP_ULT</b>	Float	Population as at Ultimate
	<b>GFA_BASE</b>	Float	Gross Floor Area as at year 0
	<b>GFA_1</b>	Float	Gross Floor Area as at year 1
	<b>GFA_3</b>	Float	Gross Floor Area as at year 3
	<b>GFA_5</b>	Float	Gross Floor Area as at year 5
	<b>GFA_10</b>	Float	Gross Floor Area as at year 10
	<b>GFA_15</b>	Float	Gross Floor Area as at year 15
	<b>GFA_20</b>	Float	Gross Floor Area as at year 20
<b>GFA_25</b>	Float	Gross Floor Area as at year 25	
<b>GFA_30</b>	Float	Gross Floor Area as at year 30	
<b>GFA_35</b>	Float	Gross Floor Area as at year 35	
<b>GFA_40</b>	Float	Gross Floor Area as at year 40	
<b>GFA_45</b>	Float	Gross Floor Area as at year 45	
<b>GFA_50</b>	Float	Gross Floor Area as at year 50	
<b>GFA_ULT</b>	Float	Gross Floor Area as at Ultimate	