



Member of the Surbana Jurong Group

## Engineering Services Report

# Tinley Manor South Banks

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## EXECUTIVE SUMMARY

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Tongaat Hulett Developments (THD) intends developing the approximately 485 ha mixed use Tinley Manor South Banks located within the Ilembe District Municipality. SMEC South Africa has been appointed to investigate and report on available municipal services and upgrades required to service the proposed development.

The development will be rolled out in a phased manner over the next 20 years. There are 10 proposed phases for this development.

Bulk water will be supplied to the development from the Tafeni Reservoir via a proposed 600 mm steel bulk water main. The Tafeni Reservoir will require upgrading to an ultimate capacity of 20.5ML. Upgrading will be phased so as to meet the demands of the proposed development. The environmental approval for the Tafeni Reservoir upgrade, as well as the construction of the 600 mm diameter steel bulk water main, will be submitted under a separate application.

Wastewater generated by the development will either gravitate or be pumped to the existing Sheffield Waste Water Treatment Works (WWTW). The Sheffield WWTW is currently underutilised. The WWTW has sufficient spare capacity to treat the sewer generated from at least the first four phases of the development. Thereafter an upgrade will be required. The WWTW can be upgraded to an ultimate capacity of 18 M $\ell$ /day.

At present, road access to the site is via the N2 freeway; exit 214 (Umhlali), Sheffield Beach road and an existing gravel road. The gravel access will be upgraded to a surfaced dual carriage roadway. This roadway will be constructed in phases in line with the development phasing. It is understood that, in future, the main access may serve as an arterial route.

Access to the sub-region will be improved by the construction of a new interchange, adjacent to the development, as well as the upgrading of the P228.

A detailed Stormwater Management Plan has been prepared separately.

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## 1. INTRODUCTION

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SMEC South Africa has been appointed by Tongaat Hulett Developments (THD) to assess the extent and capacity of existing municipal services that will be affected by the proposed Tinley Manor Development as well as any upgrades required to service the increased demand created by the development.

## 2. LOCATION AND EXTENT

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(Refer to **Appendix A**: DH0014 – LOC – 01)

Tinley Manor South is approximately 485 hectares in size and is located immediately South of the Umhlali River and East of the N2 freeway.

## 3. SITE DESCRIPTION

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(Refer to **Appendix B**: DH0014 – AERIAL – 01)

The site is characterized by a series of undulating ridges and steep valleys. The majority of the site is currently under sugarcane production and the valleys have been drained to increase the area of arable land.

The Sheffield Waste Water Treatment Works (WWTW) is located within the development area and is operated by Sembcorp Siza Water (SSW) under the auspices of Ilembe District Municipality (IDM). The property on which the WWTW is located is under the ownership of IDM and thus falls outside this project's footprint.

## 4. BACKGROUND

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The previous Engineering Services Report prepared in January 2016 (Revision 4) excluded the following:

### 4.1.1 Reservoir

Refer to Clause 9.2.

It was originally proposed that TMSB should receive water from the proposed Seaton Delaval reservoir. Due to the uncertainty surrounding the Seaton Delaval Development, it is now proposed that the existing Tafeni Reservoir services the TMSB development. This involves the construction of an additional 4 x 4.5ML cells. The new ultimate capacity of the Tafeni Reservoir will be 20.5ML.

The upgrade to the Tafeni Reservoir does not form part of the environmental authorisation application for the development and will be included in a separate application for Sembcorp Siza Water (SSW).

#### **4.1.2 Bulk Water Line**

Refer to Clause 9.2.

The bulk watermain alignment changed from the Seaton Delaval Reservoir to the Tafeni Reservoir. The proposed 600mm diameter steel bulk water main will follow the alignment of the P228 and will be constructed within the road reserve. The bulk water main does not form part of this application. The proposed new 600 mm diameter steel bulk water main does not form part of the environmental authorisation application for the development and will be included in a separate application for Sembcorp Siza Water (SSW).

#### **4.1.3 Sewer**

Refer to clause 9.3.

The required number of sewer pump stations was reduced from 4 in the previous submission to 3 in this submission. This was achieved through SSW agreeing to reduce their grade requirements for larger diameter pipes. This also resulted in a slight revision to the sewer network.

#### **4.1.4 Stormwater Management Facilities**

Refer to clause 9.4

The locations of the stormwater management facilities were revised. Alternative solutions had to be found in order to minimize wetland losses. A number of swales have been included in the SWMP.



#### 4.1.5 Road Layout

Refer to clause 9.5.

Minor revisions to the road layout were done and include the following:

- a) Possible road links into Seaton Delaval.
- b) Possible future connection to Colwyn Drive via a road servitude for future connection to the border of the property.
- c) Realignment of the beach road, providing a third possible access into the adjacent Seaton Delaval development.
- d) Widening of road reserves to align with the Traffic Impact Assessment
- e) Provision of adequate road reserve for the Kwadukuza Municipality's (KDM) proposed future North South Link Road.

#### 4.1.6 Irrigation

Refer to clause 9.6.

The irrigation network and proposed dam is added to this submission.

## 5. FRAMEWORK/PROPOSED LAND USE

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(Refer to **Appendix C** – DH0014 – FRAME – 01)

Large portions of the project area have been identified as wetlands and will be retained as open space. The balance of the site will be developed into residential, resorts and a small component of mixed use. The proposed land use distribution is summarized in the Table 1:

**Table 1: Land-use Areas**

DESCRIPTION	AREA (Ha)
Retail 1 (MU)	20.46
Retail 2	5.36
Special Residential 1500m <sup>2</sup>	24.74
Special Residential 1000m <sup>2</sup>	23.72
Special Residential 600/800m <sup>2</sup>	18.55
Medium Density (MDR)	44.78
High Density (75 units/ha)	14.66
High Density (75 units/ha plus 10% commercial)	3.56
Resort/Hospitality	12.00
Community	12.43
Conservation	246.35
Private Open Space	5.50
Roads	52.31
<b>TOTALS</b>	<b>484.23</b>

## 6. GEOTECHNICAL ASSESSMENT

The following extracts have been sourced from the geotechnical investigation undertaken by Drennan Maud and Partners, Report no: 23312 dated December 2012.

“The proposed development of the Tinley Manor - South Bank area is considered feasible as no catastrophic geological flaws exist that would exclude the entire area from development, although some areas should be avoided in terms of slope stability and problem soils. Notwithstanding the above the development of the area should be considered as challenging due to the geological constraints associated with the prevailing subsoil and ground water conditions present on site.

As such for planning and construction of the proposed development, the recommendations given above should be strictly adhered to. These amount to no more than sound building practices appropriate for the geotechnical constraints associated with the onsite subsoil conditions. Site specific geotechnical investigation will be required at a later date and should include provisions for regular supervision by a geological engineering professional during development.”

## 7. EXISTING INFRASTRUCTURE

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GIS data sourced from SSW was used to determine the extent of the existing water and sanitation infrastructure.

### 7.1 Water

(Refer to **Appendix D** – DH0014 – WATER – 01)

The Tafeni Reservoir (2.5 ML) and Tinley Manor Reservoir (0.25 ML) are the closest existing reservoirs to the proposed development. There is an existing 250 mm water main which terminates near the gravel access road to the project area and a 110 mm diameter water main which traverses the project area (approximately 200m parallel to the coastline) crossing the Umhlali River to supply the Tinley Manor Reservoir.

### 7.2 Sewer

(Refer to **Appendix E** – DH0014 – SEWER – 01)

The existing Sheffield WWTW (see Figure 1 below) is located within the project boundary. The WWTW is sized to accommodate 6 Mℓ/day, but is currently operating well below capacity. Future upgrades to the WWTW have been included in the planning and design of the Sheffield WWTW, the ultimate capacity of the treatment works being 18 Mℓ/day.

Details of the Sheffield WWTW as furnished by Sembcorp Siza Water:

- Current Capacity : 6 Mℓ /day
- Current Usage : 0.3 – 0.5 Mℓ /day



**Figure 1 Sheffield Waste Water Treatment Works**

### **7.3 Roads**

(Refer to **Appendix F** – DH0014 – ROADS – 01)

Access to the site is via the N2 freeway, Umhlali interchange (exit 214), Salt Rock Road, Sheffield Beach Road and an existing gravel road. The gravel road is used to access the existing farm and to allow SSW to access the WWTW. This access will also be utilised during the construction phase.

## **8. PHASING**

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(Refer to **Appendix D** – DH0014-PHASING-01)

The proposed development will be done in a phased manner over a 20 year period. A summary of the intended phasing is included in Table 2 below and should be read in conjunction with the Phasing Drawings in **Appendix D**

**Table 2: Development Phasing**

Phase	Estimated Construction Date	Land Use	Infrastructure Required									
			Water		Sewer		Roads and Access		Irrigation		Electrical	
			Infrastructure	Responsible Party	Infrastructure	Responsible Party	Infrastructure	Responsible Party	Infrastructure	Responsible Party	Infrastructure	Responsible Party
Phase 1	2018	Residential	Internal Network	THD	Internal Sewer	THD	P228 Upgrade	KZN DoT to implement	Storage Dam, Pump Stations and Irrigation Network	THD	MV Service cable to substation, Medium Voltage, Low voltage and street lighting	THD
							Internal Roads	THD to implement				
Phase 2	2020	Residential	Tafeni Reservoir 4.5Mℓ cell	SSW through SLA	Internal Sewer	THD	Internal Roads	THD to implement	Internal Irrigation	THD	Medium Voltage, Low Voltage and Street Lighting	THD
			600 mm diameter bulk water main	SSW through SLA								
			Internal Network	THD								
Phase 3	2022	Residential	Internal Network	THD	Internal Sewer	THD	Internal Roads	THD to implement	Internal Irrigation	THD	Medium Voltage, Low Voltage and Street Lighting	THD
Phase 4	2024	Mixed Use Commercial	Internal Network	THD	Internal Sewer	THD	Internal Roads	THD to Implement	Internal Irrigation	THD	MV Service cable to substation, Medium Voltage, Low voltage and street lighting	THD
		Residential										
Phase 5	2026	Residential	Tafeni Reservoir 4.5Mℓ cell	SSW through SLA	Internal Sewer	THD	Internal Roads	THD to Implement	Internal Irrigation	THD	Medium Voltage, Low Voltage and Street Lighting	THD
			Internal Network	THD								
Phase 6	2028	Residential	Internal Network	THD	Internal Sewer	THD	Internal Roads	THD to Implement	Internal Irrigation	THD	Medium Voltage, Low Voltage and Street Lighting	THD
Phase 7	2030	Residential	Internal Network	THD	Internal Sewer	THD	Internal Roads	THD to Implement	Internal Irrigation	THD	Medium Voltage, Low Voltage and Street Lighting	THD
Phase 8	2032	Residential	Internal Network	THD	Internal Sewer	THD	Internal Roads	THD to Implement	Internal Irrigation	THD	Medium Voltage, Low Voltage and Street Lighting	THD
		Resort										
Phase 9	2034	Commercial	Internal Network	THD	Internal Sewer	THD	Internal Roads	THD to Implement	Internal Irrigation	THD	Medium Voltage, Low Voltage and Street Lighting	THD
		Residential			Sewer Pump Station and Rising Main	THD						
Phase 10	2036	Mixed Use Commercial	Tafeni Reservoir 4.5Mℓ cell	SSW through SLA	Internal Sewer	THD	Internal Roads	THD to Implement	Internal Irrigation	THD	Medium Voltage, Low Voltage and Street Lighting	THD

## 9. PROPOSED BULK INFRASTRUCTURE

### 9.1 Demand Parameters

Tabulated below are the design parameters used in the calculation of the anticipated Total Average Daily Demands for water and Average Daily Flows for Sewer for the different land uses. These were considered as part of the SSW Bulk Planning Report prepared by SMEC South Africa on behalf of SSW and agreed to (refer to **Appendix K**).

**Table 3: Water Demand Parameters**

Residential Type	Daily Water Demand Per Unit (ℓ/Unit/Day)	Allowance For Water Loss	Total Average Daily Water Demand (Mℓ/Unit/Day)
Rural/Low Income	300	15%	0.000345
Middle Income	700	15%	0.000805
Upper Income	1200	15%	0.001380
Golf Course Estate	1500	15%	0.001725
Resort/Tourism (Private)	900	15%	0.001035
Recreational	1000	15%	0.001150
Commercial	Daily Water Demand (ℓ/m <sup>2</sup> )	Allowance For Water Loss	Total Average Daily Water Demand (Mℓ/Ha/Day)
Commercial Bulk	6,25	15%	0,072
Industrial Type	Daily Water Demand Per Platform (ℓ/m <sup>2</sup> /Day)	Allowance For Water Loss	Total Average Daily Water Demand (Mℓ/Ha/Day)
Light	1,875	15%	0,022
General	3,125	15%	0,036
Heavy	4,375	15%	0,050
Average			<b>0,036</b>

**Table 4: Sewer Flow Parameters**

<b>Residential Type</b>	<b>Daily Sewer Generation Per Unit (l/Unit/Day)</b>	<b>Allowance For Infiltration</b>	<b>Total Average Daily Flow (Ml/Unit/Day)</b>
Rural/Low Income	210	30%	0.00027
Middle Income	700	30%	0.00091
Upper Income	840	30%	0.00109
Golf Course Estate	1050	30%	0.00137
Resort/Tourism (Private)	630	30%	0.00082
Recreational	700	30%	0.00091
<b>Commercial</b>	<b>Daily Water Demand (l/m<sup>2</sup>)</b>	<b>Allowance For Infiltration</b>	<b>Total Average Daily Water Demand (Ml/Ha/Day)</b>
Commercial Bulk	4.38	30%	0,057
<b>Industrial Type</b>	<b>Daily Water Demand Per Platform (l/m<sup>2</sup>/Day)</b>	<b>Allowance For Infiltration</b>	<b>Total Average Daily Water Demand (Ml/Ha/Day)</b>
Light	1.3	30%	0.017
General	2.2	30%	0.028
Heavy	3.1	30%	0.040
Average			<b>0.028</b>

## 9.2 Water

(Refer to **Appendix E** – DH0014-WATER-01)

The Tinley Manor South Banks Development is to be serviced from the Tafeni Reservoir. An upgrade of the reservoir will be required to meet the ultimate water demand of the development.

Four additional 4.5 ML cells will be required, constructed in a phased manner as required. This will result in a total ultimate reservoir capacity of 20.5 ML, which is sufficient to service the entire Tinley Manor South Banks Development, along with the existing planned ultimate service area for the Tafeni Reservoir. The 20.5 ML will provide a 48 hour storage capacity for the ultimate development to take place within its service area.

It is proposed that the existing 250 mm diameter water main, running from Tafeni Reservoir along the P228, be extended to supply the first phase of the development. The proposed 250mm watermain will be laid within the road reserve. This water main will have sufficient capacity to service the first development phase of the Tinley Manor South Banks development. The 250 mm diameter water main will ultimately service the Seaton Delaval Development and is therefore only an interim supply for Tinley Manor South Banks.

For the ultimate bulk water supply, a new 600 mm diameter steel bulk water main will need to be constructed from the Tafeni Reservoir to the development boundary.

The anticipated phased water demand is tabulated below (Refer to **Appendix J** for the full calculations).

**Table 5: Water Demand per Phase**

NAME	TOTAL ADD (Mℓ/day)	CUMULATIVE ADD (Mℓ/day)
PHASE 1	0.33	0.33
PHASE 2	0.28	0.61
PHASE 3	0.39	1.00
PHASE 4	1.13	2.13
PHASE 5	0.44	2.57
PHASE 6	0.89	3.46
PHASE 7	0.17	3.63
PHASE 8	0.54	4.17
PHASE 9	0.35	4.52
PHASE 10	1.79	6.31
<b>TOTAL</b>		<b>6.31</b>

The Environmental Impact Assessments for the proposed Tafeni Reservoir and the new proposed 600 mm diameter steel bulk water main will be applied for by SSW on a separate application, as they will be the custodians of the infrastructure.

### 9.3 Sewer

(Refer to **Appendix F** – DH0014-SEWER-01)

Sewage generated will be treated at the Sheffield WWTW.

The current flow into the Sheffield Waste Water Treatment Works ranges between 0.3 Mℓ/day and 0.5 Mℓ/day. Consequently, the current Sheffield WWTW has sufficient



capacity to treat sewer from the proposed Tinley Manor South Banks development for at least the first four phases without any upgrades required. Thereafter the WWTW will need to be upgraded to accommodate sewer from Phases 5 to 10. The ultimate capacity of the Sheffield Waste Water Treatment Works is 18 Mℓ/day.

The anticipated phased sewer generation expected from the development is tabulated in Table 5 below (Refer to **Appendix K** for calculations).

**Table 6: Sewer Flow per Phase**

NAME	TOTAL ADF (Mℓ/day)	CUMULATIVE ADF (Mℓ/day)
PHASE 1	0.25	0.25
PHASE 2	0.22	0.47
PHASE 3	0.31	0.78
PHASE 4	0.90	1.68
PHASE 5	0.34	2.02
PHASE 6	0.71	2.73
PHASE 7	0.14	2.87
PHASE 8	0.47	3.34
PHASE 9	0.28	3.62
PHASE 10	1.45	5.07
<b>TOTAL</b>		<b>5.07</b>

### 9.3.1 Sewer Pumpstations

(Refer to **Appendix F** – DH0014-SEWER-01)

Due to the topography of the proposed development area, 3 sewer pump stations will be required to convey sewer to the Sheffield WWTW. The pump stations will be designed in accordance with SSW’s specifications and guidelines.

Emergency storage to be provided for each of the pump stations is four hours of average daily flow with a peak flow period included in these four hours. Due to its proximity to the coastal dune forest, the easternmost pump station (Pumpstation3) will also include an emergency overflow facility to prevent contamination of the coastal dune forest. Should an overflow event occur, the sewage contained within the overflow facility will be removed by SSW and returned to the sewer network to be treated.

## 9.4 Stormwater

A Stormwater Management Plan (SWMP) for the Tinley Manor South Development has been prepared by SMEC, refer to Report No DR2014/48.

The following key aspects will be implemented during the detailed design plan:

- All internal storm water reticulation will be designed in accordance with municipal guidelines.
- The proposed road network will act as the primary storm water collector with controlled discharge to attenuation facilities.
- The secondary system (pipe network) will be designed to accommodate the 1:3 and 1:10 year peak flow at critical points.
- Dry Stormwater Management Facilities (SMF) are normally used to reduce runoff into the natural drainage system to the pre-development 1:10 and 1:50 peak flow rates. SMFs will be sized to ensure that pre-development 1:10 and 1:50 discharge flows are not exceeded.

## 9.5 Roads

(Refer to **Appendix G** DH0014—ROADS-01)

### 9.5.1 Proposed Interchange

A Traffic Impact Assessment (TIA) has been compiled by Aurecon, indicating that an interchange is required on the N2 to provide direct access to development via the P228. Due to the phased nature of the development, an interchange will only be required once construction of Phase 5 commences. At Phase 5, only a simple diamond interchange will be required which will be constructed by SANRAL and not included in this Environmental Impact Assessment.

The proposed simple diamond interchange will need to be upgraded to the ultimate proposed interchange in order to commence with Phase 10 of the development. The interchange will be constructed by SANRAL and is not included in this Environmental Impact Assessment.

### 9.5.2 Proposed North South Link (P228)

KDM has indicated their intention to construct a North South Link road, East of the N2. This link road will follow the alignment of the current P228 South of the Tinley Manor South Banks Development and will dissect the development going north after the existing P228 crosses over the N2.

The North South Link Road does not form part of the Tinley Manor South Banks Development and will be implemented by KDM in the future. In order to ensure uniformity with the long term planning of the local municipality, sufficient road reserve width has been provided for along the extension of the access road into Tinley Manor South Banks to allow for a North South Link Road.

### 9.5.3 Additional connectivity with adjacent developments

(Refer to **Appendix M** correspondence with KDM)

As per KDM's request, to provide alternative accesses to the development, the town planning layout has been designed in such a manner so as to provide possible future road connections between Tinley Manor South Banks and the adjacent developments. Two possible road connections have been allowed for off the Main Spine Road into the future Seaton Delaval Development. A third possible connection point to Seaton Delaval is provided along the beach road.

Provision has been made in the town planning layout for a future connection to the extended Colwyn Drive. The extension of Colwyn drive, if implemented at all, will be done by Kwadukuza Municipality at a later stage.

### 9.5.4 Traffic Road Layouts

(Refer to **Appendix H** DH0014-TRL-01)

All internal roads will be designed according to UTG/Red Book standards as indicated by KDM. Sufficient road widths have been allowed for along the main spine, residential spine, commercial spine and residential collector roads, to accommodate non-motorised transportation as well as bus bays for public transport within the development.

## 9.6 Bulk Irrigation

(Refer to **Appendix I** – DH0014-IRRIGATION-01)

Based on discussions with the landscape architects, Uys and White, the land uses that will require irrigation are open spaces, resorts, community, selected verges and medians. The anticipated total irrigation surface area is approximately 225 000 m<sup>2</sup> which required a total weekly irrigation volume of 7.75 ML or 1.55 Ml/day over 5 days. To reduce losses due to evaporation and to maximize the benefit of use by pedestrians, an 8 hour nightly irrigation time is proposed.

Mindful that the KZN region recently experienced a drought, four potential water sources for irrigation were investigated:

1. Potable water;

Using potable water for irrigation is not deemed an economically feasible solution.

2. Existing Siza Water Borehole;

SSW has indicated that their borehole water can be utilized for irrigation in the interim. The quality of the borehole water however necessitates diluting or treatment to get it to an acceptable quality for irrigation. The borehole is located within the Sheffield WWTW property boundary.

3. River abstraction from the Umhlali River;

The Mhlali Estuary is *one of the core estuarine systems to be protected in order to reach the national estuarine biodiversity conservation targets*. Thus, suitable protection of the estuary must be established and appropriate management interventions and mitigation measures applied towards reaching an improved condition.

Currently, the state of the estuary is classified as Category D, that is to say, it has been largely modified from its pristine condition. Through various assessments, the estuary is deemed regionally and nationally important and therefore should be managed to obtain a Category B status (i.e. resembling a largely natural system with few modifications). The best scenario to ensure a Category B status requires the present MAR (minus the WWTW discharge), and including remedial actions: rehabilitation of flood plain, removal of old weir, no artificial breaching, and no sugar cane farming in the Estuary Functional Zone, as given in the Ecological Reserve study. Additional abstraction will result in reduced MAR reaching the estuary and is in opposition to improving the health of this national asset. Therefore, the extraction from the estuary is not deemed feasible.

*(Extracted from The Tinley Manor Southbank's Coastal Development: Estuarine Impact Assessment and Specialist Input for the Mhlali Estuary. Version 3. Report prepared for Tongaat Hulett Developments by Royal HaskoningDHV dated February 2017)*

4. Utilising Treated Waste Water from Sheffield WWTW

SSW has the ability to provide treated effluent from Sheffield WWTW, subject to the effluent inflow into the WWTW. This however will be an interim measure as SSW's future plans include constructing a Reverse Osmosis (RO) Plant at Sheffield WWTW to treat effluent to supplement their potable water supply. The RO Plant is not anticipated to be constructed before Phase 5.

Two supply scenarios were considered to distribute the required weekly volumes, one which attempts to utilise gravity and the other relying on a fully pumped system. Considering the elevation ranges and hilly nature of the region it was identified that the fully pumped system will be the most effective system to adopt.

The most feasible irrigation water supply for the development is deemed to be a combination of the Sheffield WWTW effluent and the SSW borehole. This will however be an interim solution. The environmental authorisations/permits for the future source will be obtained when the interim supply is no longer sufficient/available. Alternative sources for irrigation water, including green options such as rainwater harvesting, will then be investigated.

It is proposed that an irrigation storage dam with a capacity of 3.1 Mℓ be constructed within the development, from where it will be distributed via the bulk irrigation network. The estimated irrigation demands per phase are indicated in the table 6 below:

**Table 7: Estimated Irrigation Demands per Phase**

NAME	DEMAND REQUIRED per PHASE (Ml/week)	CUMULATIVE DEMAND (Ml/week)
PHASE 1	0.69	0.69
PHASE 2	0.57	1.25
PHASE 3	0.90	2.15
PHASE 4	0.33	2.48
PHASE 5	0.36	2.84
PHASE 6	0.48	3.32
PHASE 7	0.56	3.89
PHASE 8	1.81	5.70
PHASE 9	0.14	5.84
PHASE 10	1.91	7.75
<b>TOTAL</b>		<b>7.75</b>

## **9.7 Telecommunications**

Duct crossings will be installed to allow for telecommunication infrastructure. All telecommunications will be located within the road reserve.

## **9.8 Proposed Internal Infrastructure**

Internal water and sewer infrastructure will comply with iLembe District Municipality and Sembcorp Siza Water (SSW) standards. All internal water services will be placed within the road reserve.

## **9.9 Solid Waste**

The closest available landfill is the Kwadukuza Landfill Site. It is owned and operated by the Dolphin Coast Waste Management which is responsible for collection and disposal of solid waste in the Kwadukuza, Empangeni and Richards Bay area.

## 10. CONCLUSION

---

The servicing requirements and infrastructure provisions for the Tinley Manor South Banks Development are as follows:

### Water

The estimated water demand for the development is approximately 6.31 Mℓ/day. The Tafeni Reservoir will need to be upgraded to 20.5 ML in a phased manner to meet the ultimate demands of the development and other developments in the area. A 48 hour storage capacity has been afforded for.

### Sewer

The estimated sewer flow for the development is approximately 5.04 Mℓ/day. Sewer from the development will be treated at the Sheffield WWTW. Due to the topography of the area, 3 sewer pumpstations will be required convey sewer to Sheffield's WWTW. SSW has confirmed that the WWTW is currently underutilised and is able to treat effluent for the first 4 phases without any upgrades required. Thereafter the WWTW will need to be upgraded. The ultimate capacity of the WWTW will be 18 Mℓ/day.

### Roads

According to the TIA prepared by Aurecon, an interchange is required on the N2 to provide direct access to development via the P228. A simple diamond interchange is required at Phase 5, to be upgraded to the ultimate interchange configuration at Phase 10. The town planning layout has allowed for the following:

- linkages to the adjacent development
- a road servitude for the future extension of Colwyn Drive
- adequate road reserve width for the proposed future north-south link to be implemented by KDM

### Irrigation

The estimated ultimate irrigation demand for the development is 7.75Mℓ/week. SSW has confirmed that they are willing to supply treated effluent from Sheffield WWTW along with borehole water as an interim irrigation water supply. The ultimate irrigation water supply will be investigated and applied for when it is required. This is not anticipated before Phase 5 of the development.

### Stormwater

A Stormwater Management Plan (SWMP) for the Tinley Manor South Development has been prepared by SMEC, refer to Report No DR2014/48 which deals with stormwater aspects.

### Solid Waste

The only available landfill is the Kwadukuza Landfill Site in the area. It is owned and operated by the Dolphin Coast Waste Management which is responsible for collection and disposal of solid waste in the Kwadukuza, Empangeni and Richards Bay area.



## APPENDIX A – LOCALITY PLAN

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**LEGEND**

— DEVELOPMENT BOUNDARY



**TINLEY MANOR SOUTH  
LOCALITY PLAN**

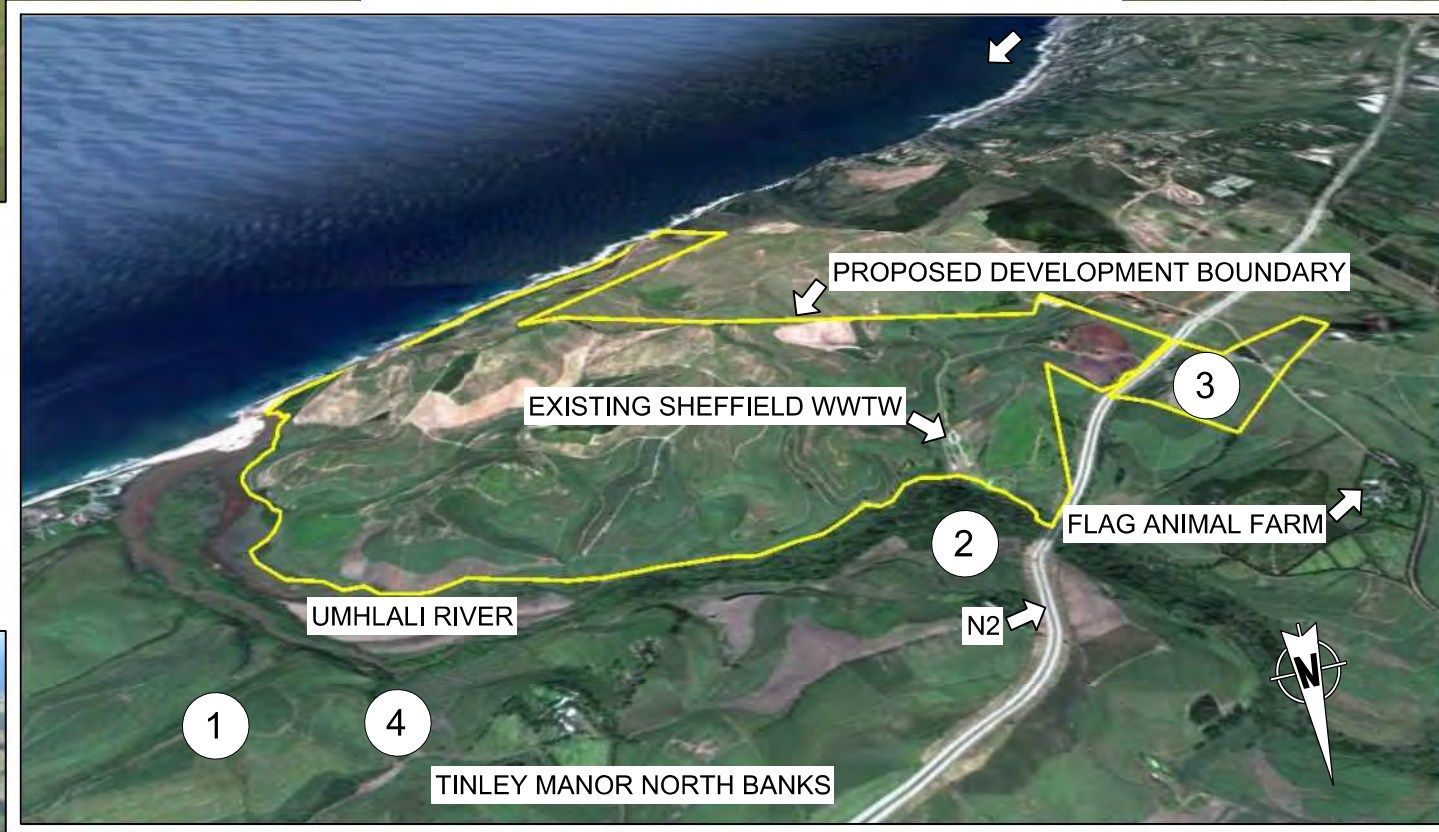
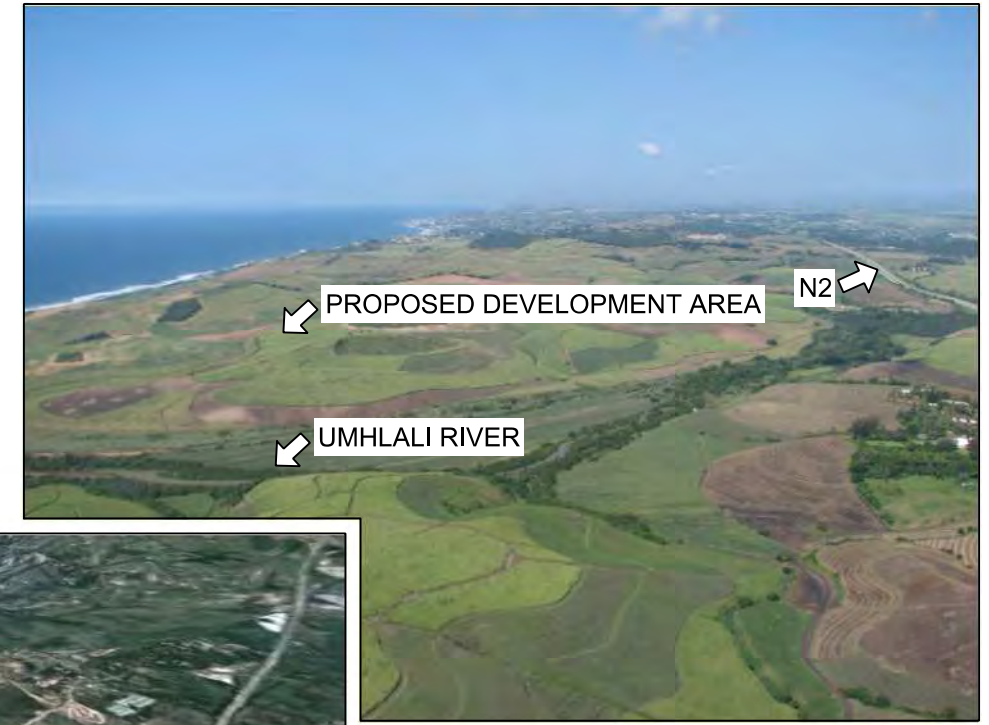
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**Tongaat Hulett**  
DEVELOPMENTS

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Drawing No  
DH0014-LOC-01

Sheet  
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Date  
MARCH 2017

## APPENDIX B - AERIAL PHOTOGRAPHY

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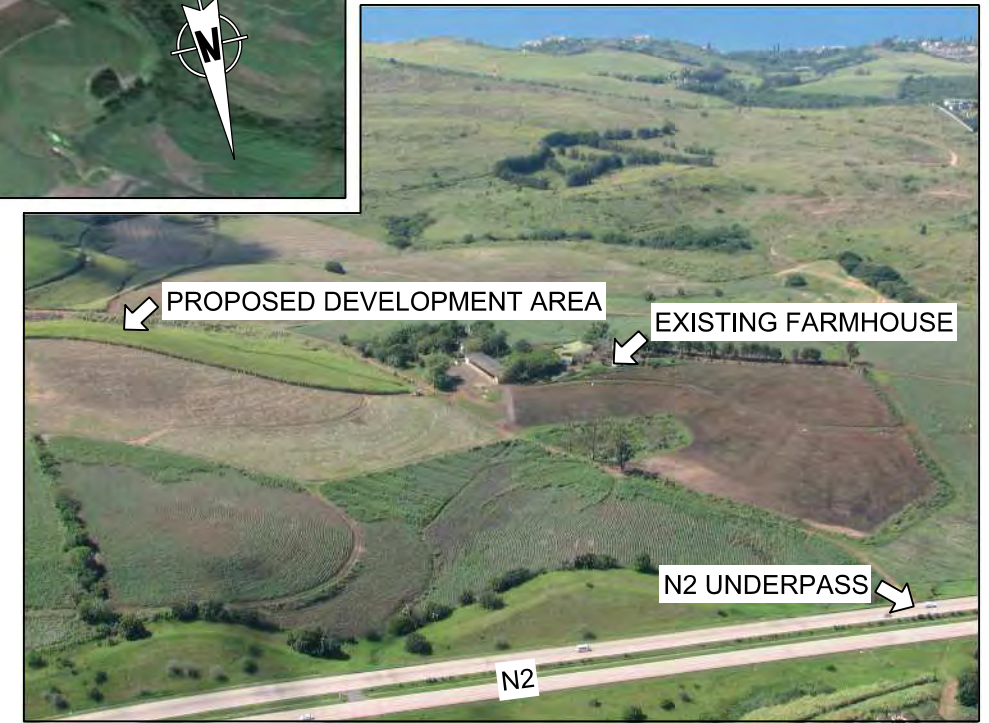
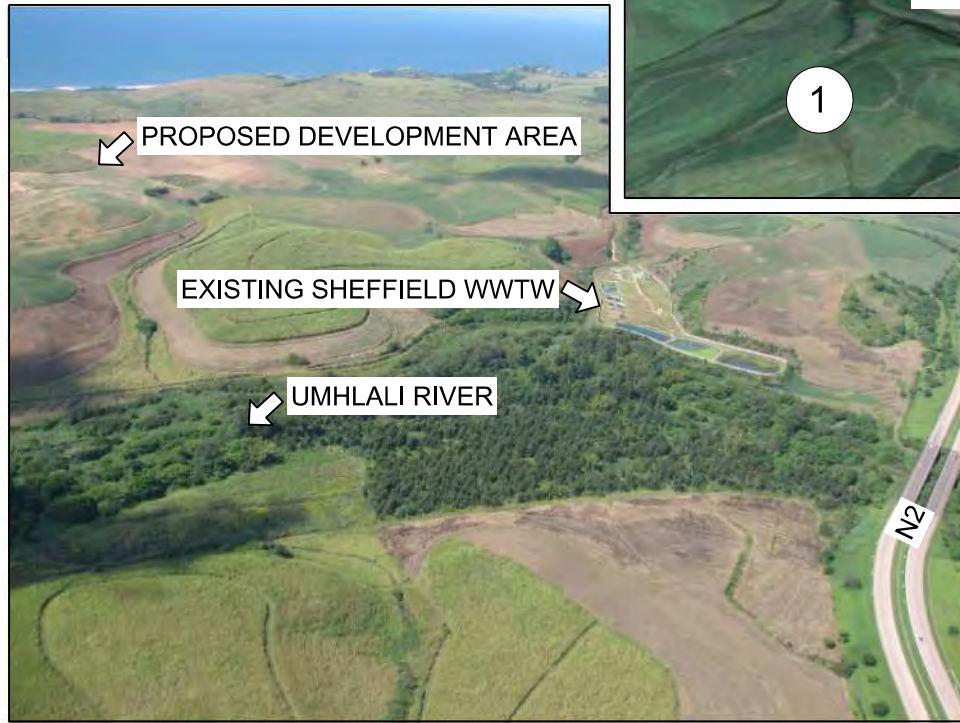


**1** LOOKING SOUTH FROM THE TINLEY MANOR NORTH BANKS

**4** LOOKING SOUTH WEST FROM TINLEY MANOR NORTH BANKS

**2** LOOKING SOUTH EAST

**3** LOOKING EAST FROM THE N2



## APPENDIX C - FRAMEWORK PLAN

---



**LEGEND**

- SINGLE RESIDENTIAL  
03x40 @ 12.5m<sup>2</sup>/ha
- SINGLE RESIDENTIAL  
10x10 @ 10.0m<sup>2</sup>/ha
- SINGLE RESIDENTIAL  
10x10 @ 10.0m<sup>2</sup>/ha
- MEDIUM DENSITY RESIDENTIAL  
05 UNITS/ha
- HIGH DENSITY RESIDENTIAL  
05 UNITS/ha WITH 10% COMMERCIAL IN TOWN CENTRE
- RESORT HOTEL/SPACILITY  
HOTEL WITH ENTERTAINMENT
- RETAIL 1  
MIXED RETAIL OFFICE/RESIDENTIAL/NOISE
- RETAIL 2  
LOW IMPACT RETAIL/ENTERTAINMENT MIXED USE
- COMMUNITY  
HIGHER ORDER COMMUNITY FACILITIES e.g. EDUCATION, HEALTH etc.
- PRIVATE OPEN SPACE  
PARKS WITHIN RESIDENTIAL AREAS
- CONSERVATION  
WETLANDS/ESTUARY/COASTAL ZONE/GRASSLANDS  
(BCL BUFFERS)
- ACCESS ROADS
- ROADS (INDICATIVE)  
FUTURE LINKS AND/OR INTERNAL ACCESS
- ROADWALK & FLOATING JETTY
- SITE BOUNDARY

**NOTES**  
ALL AREAS AND DIMENSIONS ARE APPROXIMATE AND SUBJECT TO FINAL DETAIL SURVEY

REV	DESCRIPTION	DATE	REV BY / CHECKD

DESIGNED: \_\_\_\_\_  
DRAWN: \_\_\_\_\_  
CHECKED: \_\_\_\_\_

APPROVED:  
PROJ. PRINCIPAL: \_\_\_\_\_  
PROJ. PRINCIPAL: \_\_\_\_\_  
SIGNATURE: \_\_\_\_\_  
DATE: 00/00/0000

  
**the markewicz redman partnership**  
 urban planners and designers  
 P.O. Box 11111  
 Oordevet  
 0607  
 Tel: 011 312 6225  
 Email: info@mrp.co.za

CLIENT

  
**Tongaat Hulett**

PROJECT/DRAWING TITLE








**TINLEY MANOR  
COASTAL RESORT**

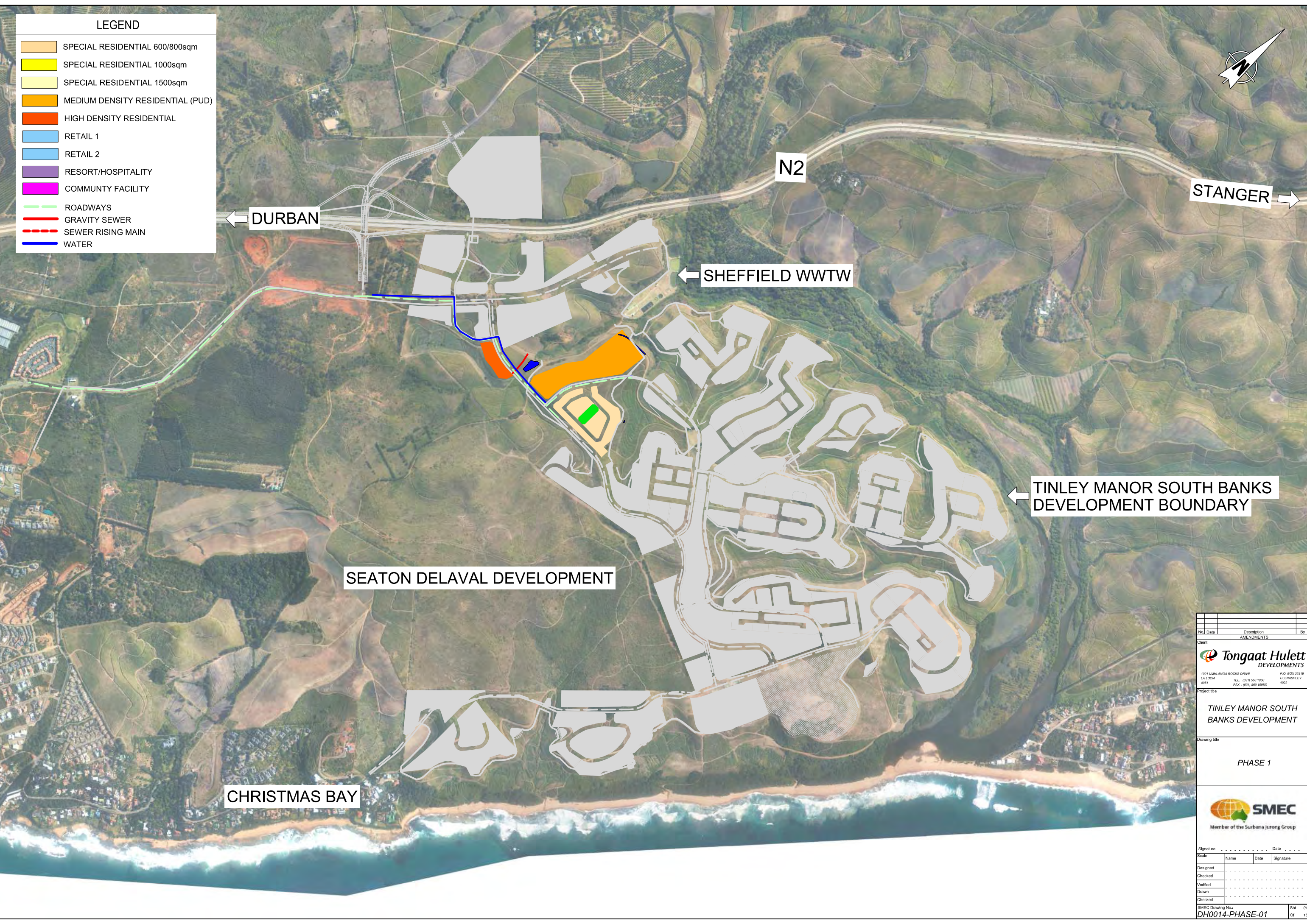
**BLOCK LAYOUT PLAN**

SCALE 1:4000	SHEET 1 OF 1
CONTRACT No.	PROJECT No. T01.DUR.000121
DRAWING No. T01.DUR.000121/03/14-03	REV 

## APPENDIX D – PHASING

---

LEGEND	
	SPECIAL RESIDENTIAL 600/800sqm
	SPECIAL RESIDENTIAL 1000sqm
	SPECIAL RESIDENTIAL 1500sqm
	MEDIUM DENSITY RESIDENTIAL (PUD)
	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



DURBAN

N2

STANGER

SHEFFIELD WWTW














TINLEY MANOR SOUTH BANKS DEVELOPMENT BOUNDARY

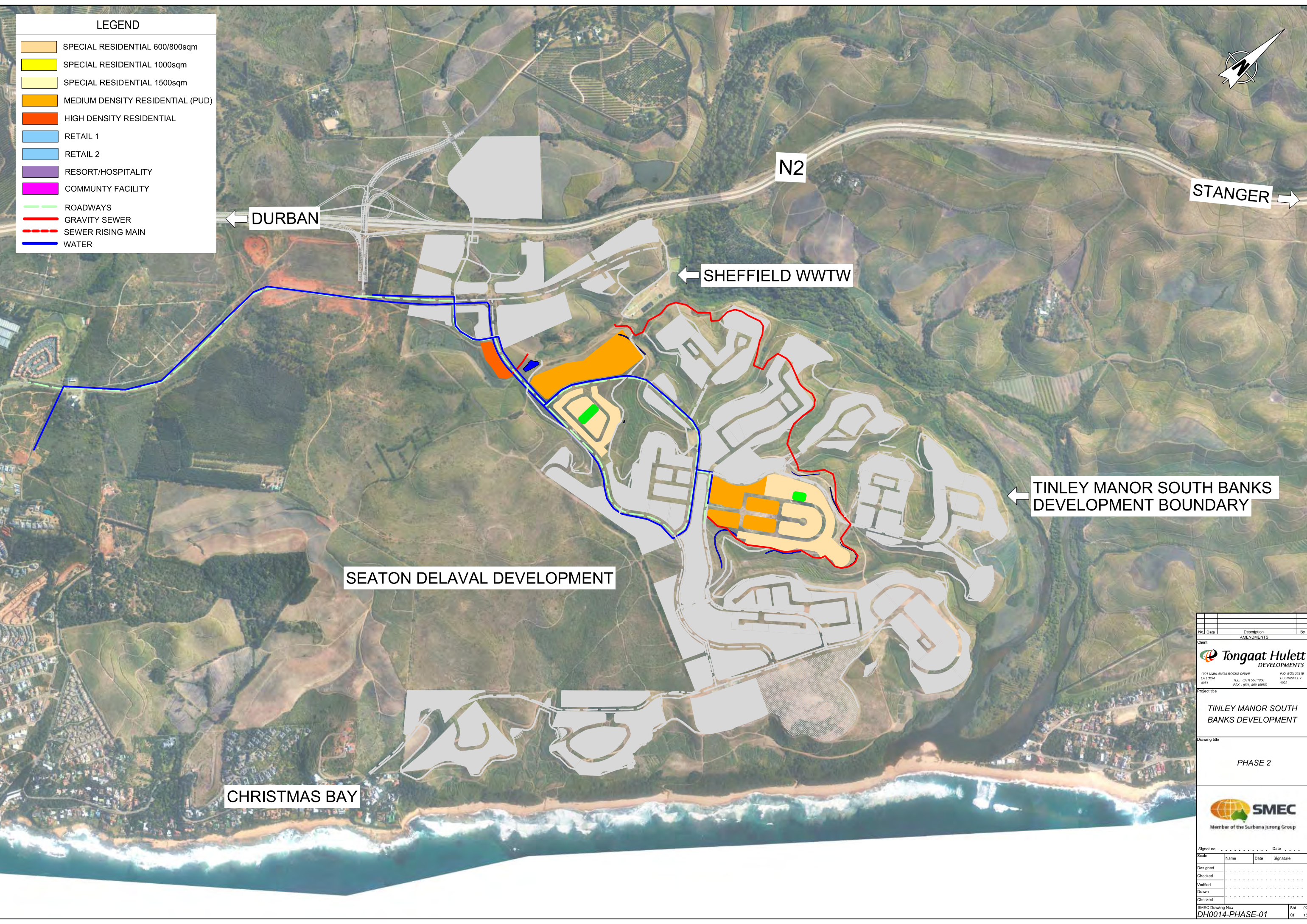
SEATON DELAVAL DEVELOPMENT

CHRISTMAS BAY

No.	Date	Description	By
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Project title			
TINLEY MANOR SOUTH BANKS DEVELOPMENT			
Drawing title			
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 Member of the Surbana Jurong Group			
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Verified	.....	.....	.....
Drawn	.....	.....	.....
Checked	.....	.....	.....
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DH0014-PHASE-01			Of 10



LEGEND	
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	SPECIAL RESIDENTIAL 1000sqm
	SPECIAL RESIDENTIAL 1500sqm
	MEDIUM DENSITY RESIDENTIAL (PUD)
	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



DURBAN

N2

STANGER













SHEFFIELD WWTW

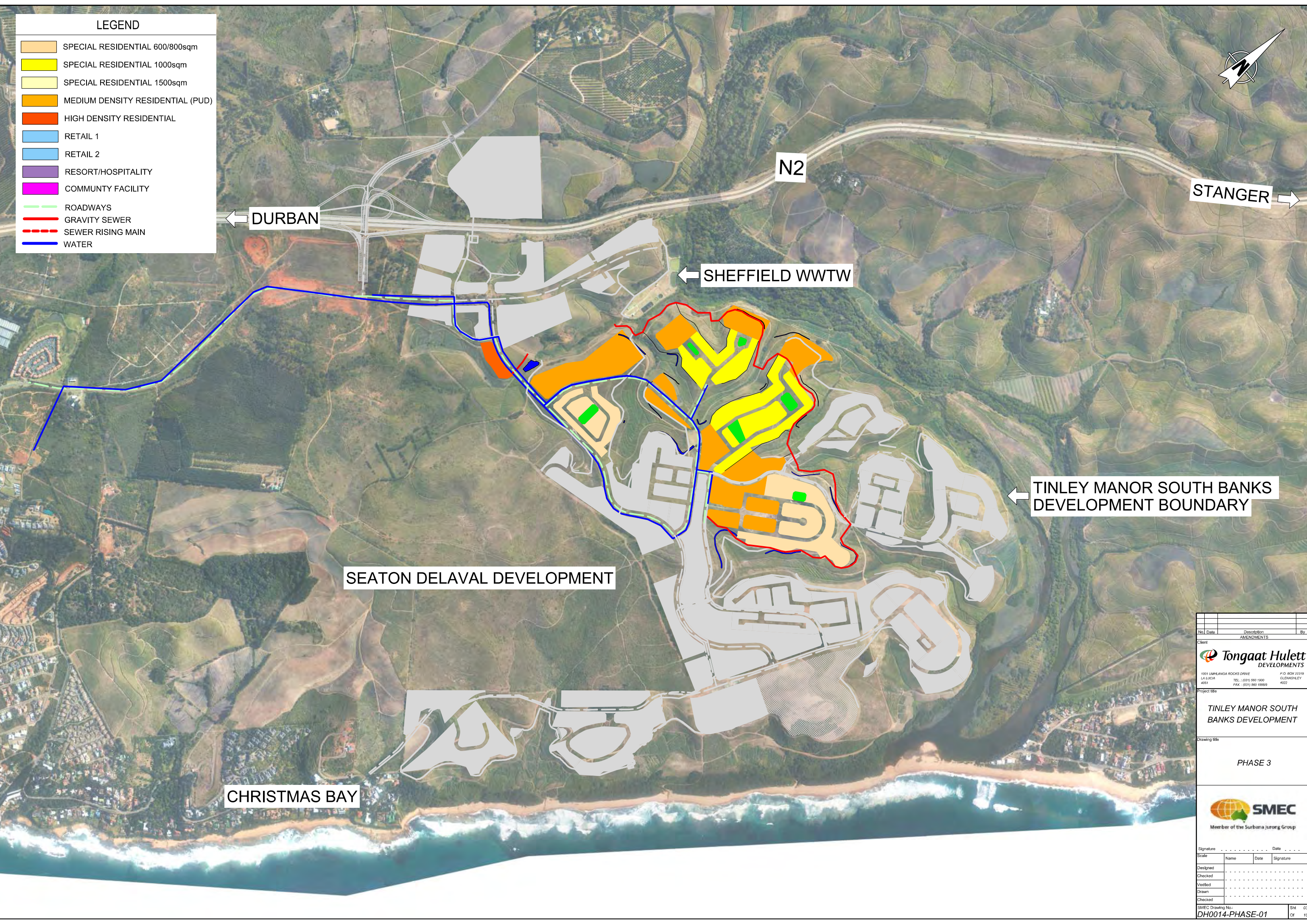
TINLEY MANOR SOUTH BANKS DEVELOPMENT BOUNDARY

SEATON DELAVAL DEVELOPMENT

CHRISTMAS BAY

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Client			
			
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	SPECIAL RESIDENTIAL 1000sqm
	SPECIAL RESIDENTIAL 1500sqm
	MEDIUM DENSITY RESIDENTIAL (PUD)
	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



DURBAN ←

N2

STANGER →











← SHEFFIELD WWTW

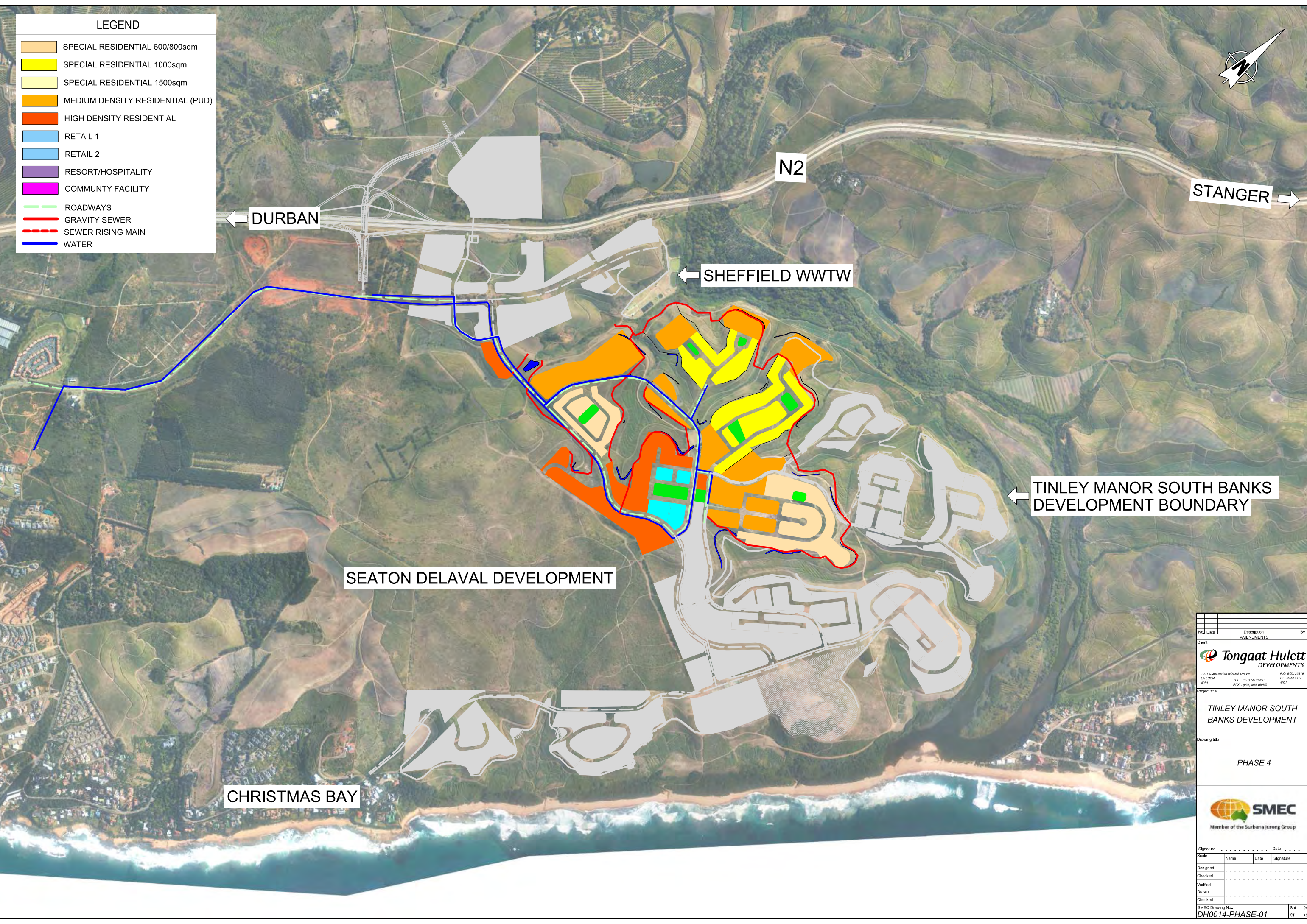
← TINLEY MANOR SOUTH BANKS DEVELOPMENT BOUNDARY

SEATON DELAVAL DEVELOPMENT

CHRISTMAS BAY

No.	Date	Description	By
		AMENDMENTS	
Client			
		1901 LAMBLANGA ROCKS DRIVE P.O. BOX 2319 LA LUCEA 4091 TEL: (031) 560 1500 CLEVERLEY 4091 FAX: (031) 960 1999 4022	
Project title			
TINLEY MANOR SOUTH BANKS DEVELOPMENT			
Drawing title			
PHASE 3			
 Member of the Surbana Jurong Group			
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	SPECIAL RESIDENTIAL 1000sqm
	SPECIAL RESIDENTIAL 1500sqm
	MEDIUM DENSITY RESIDENTIAL (PUD)
	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



No.	Date	Description	By
		AMENDMENTS	

Client  
  
 1991 LAMRANGA ROCKS DRIVE P.O. BOX 2319  
 LA LUCEA TEL: (031) 560 1500 CLEVERLEY  
 4051 FAX: (031) 560 1505 4022

Project title  
**TINLEY MANOR SOUTH BANKS DEVELOPMENT**












Drawing title  
**PHASE 4**

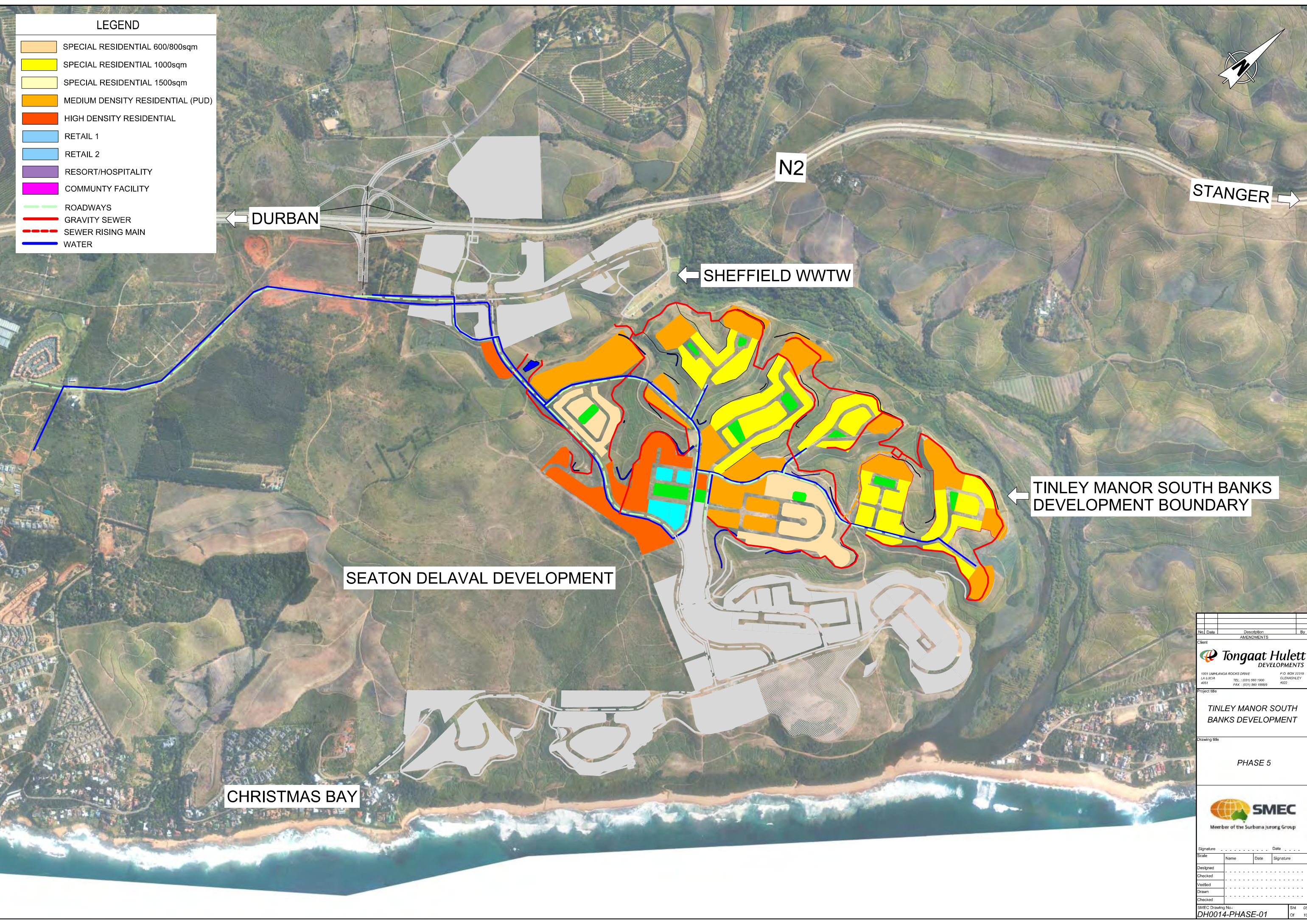
  
 Member of the Surbana Jurong Group

Signature \_\_\_\_\_ Date \_\_\_\_\_  
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Designed \_\_\_\_\_  
 Checked \_\_\_\_\_  
 Verified \_\_\_\_\_  
 Drawn \_\_\_\_\_  
 Checked \_\_\_\_\_

SMC Drawing No.: \_\_\_\_\_  
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 Of 10

LEGEND	
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	SPECIAL RESIDENTIAL 1000sqm
	SPECIAL RESIDENTIAL 1500sqm
	MEDIUM DENSITY RESIDENTIAL (PUD)
	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



DURBAN

N2

STANGER




SHEFFIELD WWTW

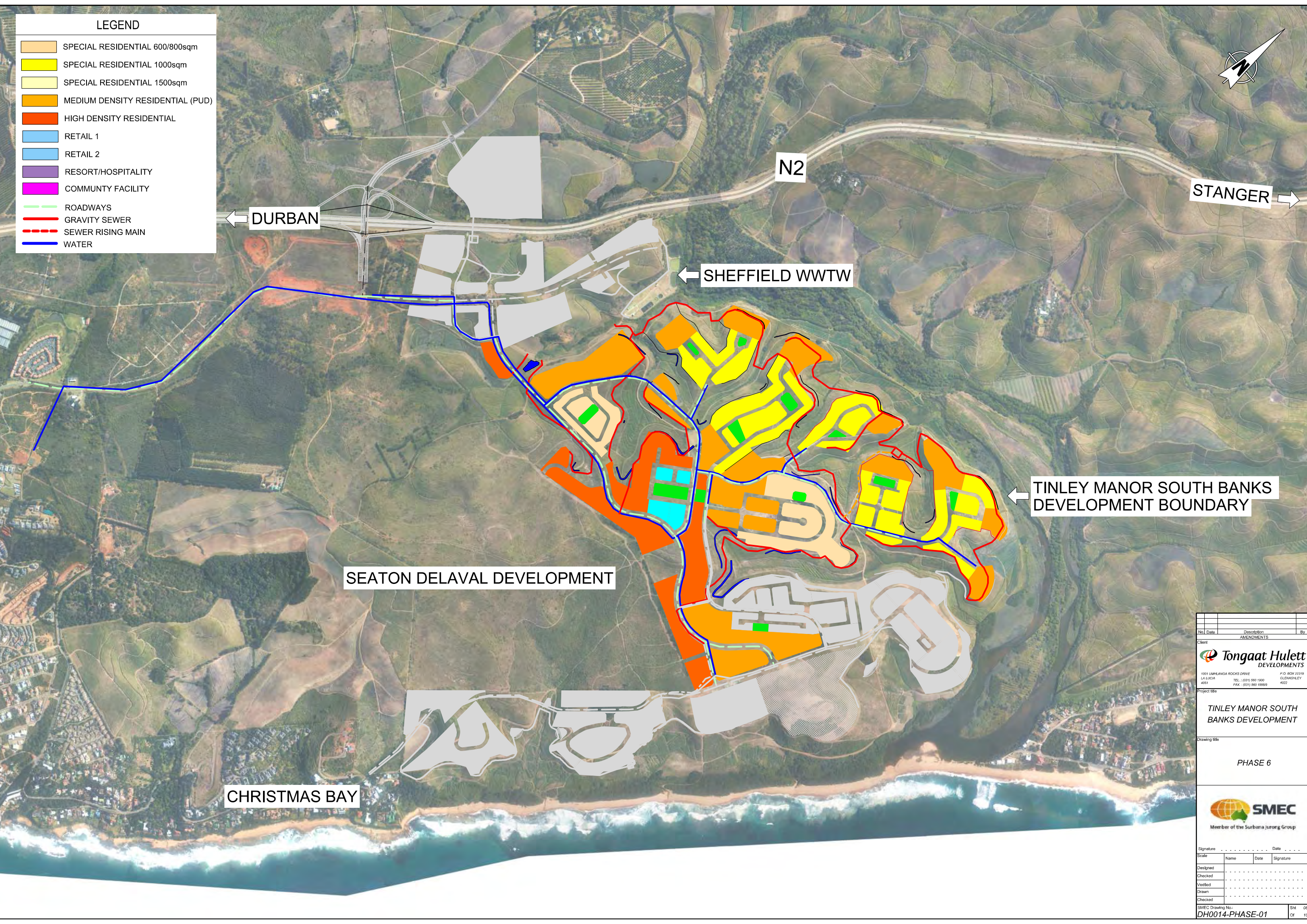
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SEATON DELAVAL DEVELOPMENT






CHRISTMAS BAY

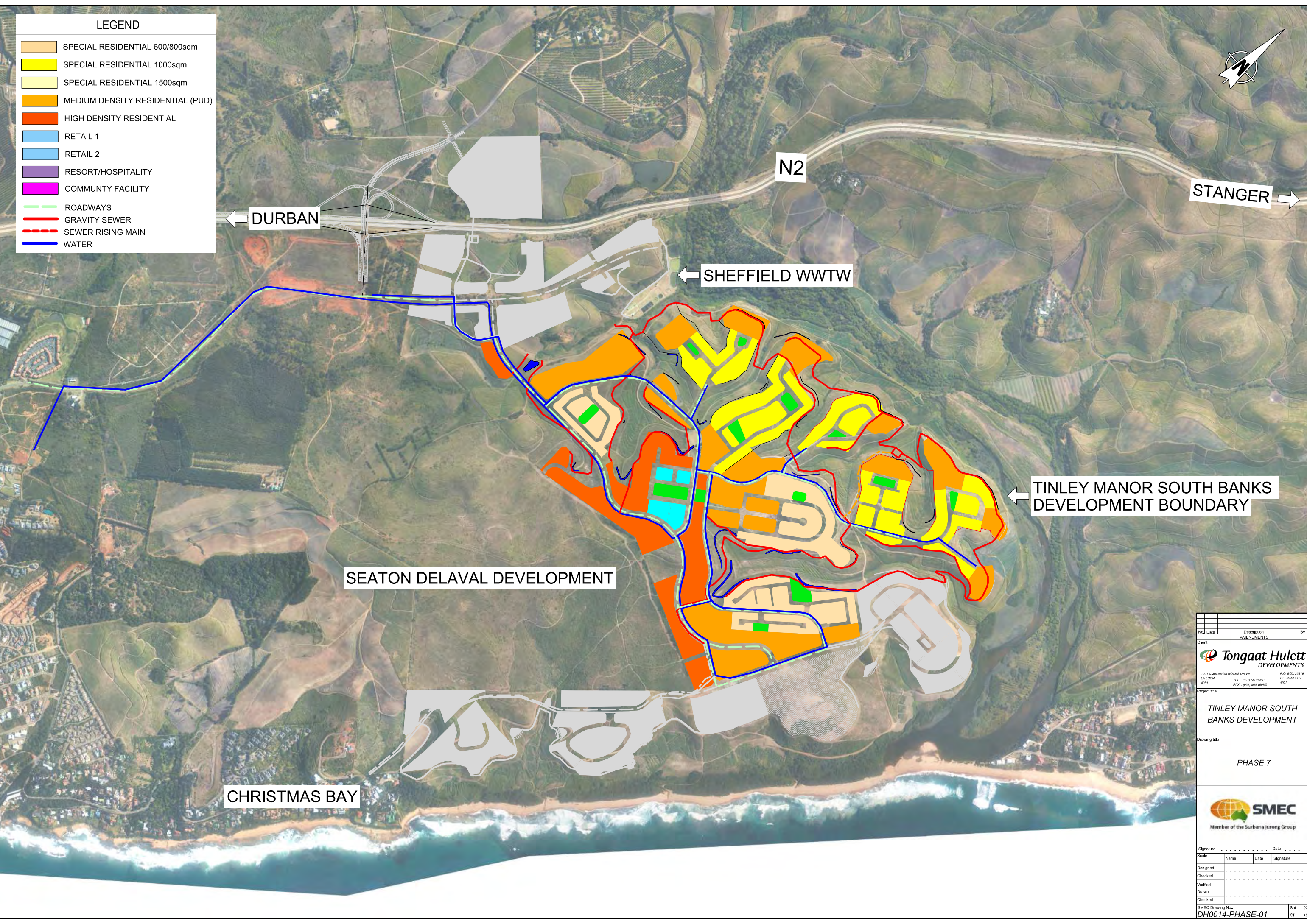
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P.O. BOX 2319 CLEVERLEY 4022			
Project title			
TINLEY MANOR SOUTH BANKS DEVELOPMENT			
Drawing title			
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 Member of the Surbana Jurong Group			
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DH0014-PHASE-01			10

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	SPECIAL RESIDENTIAL 1500sqm
	MEDIUM DENSITY RESIDENTIAL (PUD)
	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



No.	Date	Description	By
		AMENDMENTS	
Client			
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P.O. BOX 2319 CLEVERLEY 4022			
Project title			
TINLEY MANOR SOUTH BANKS DEVELOPMENT			
Drawing title			
PHASE 6			
 Member of the Surbana Jurong Group			
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Checked	.....	.....	.....
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LEGEND	
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	SPECIAL RESIDENTIAL 1000sqm
	SPECIAL RESIDENTIAL 1500sqm
	MEDIUM DENSITY RESIDENTIAL (PUD)
	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



DURBAN ←

N2

STANGER →












← SHEFFIELD WWTW

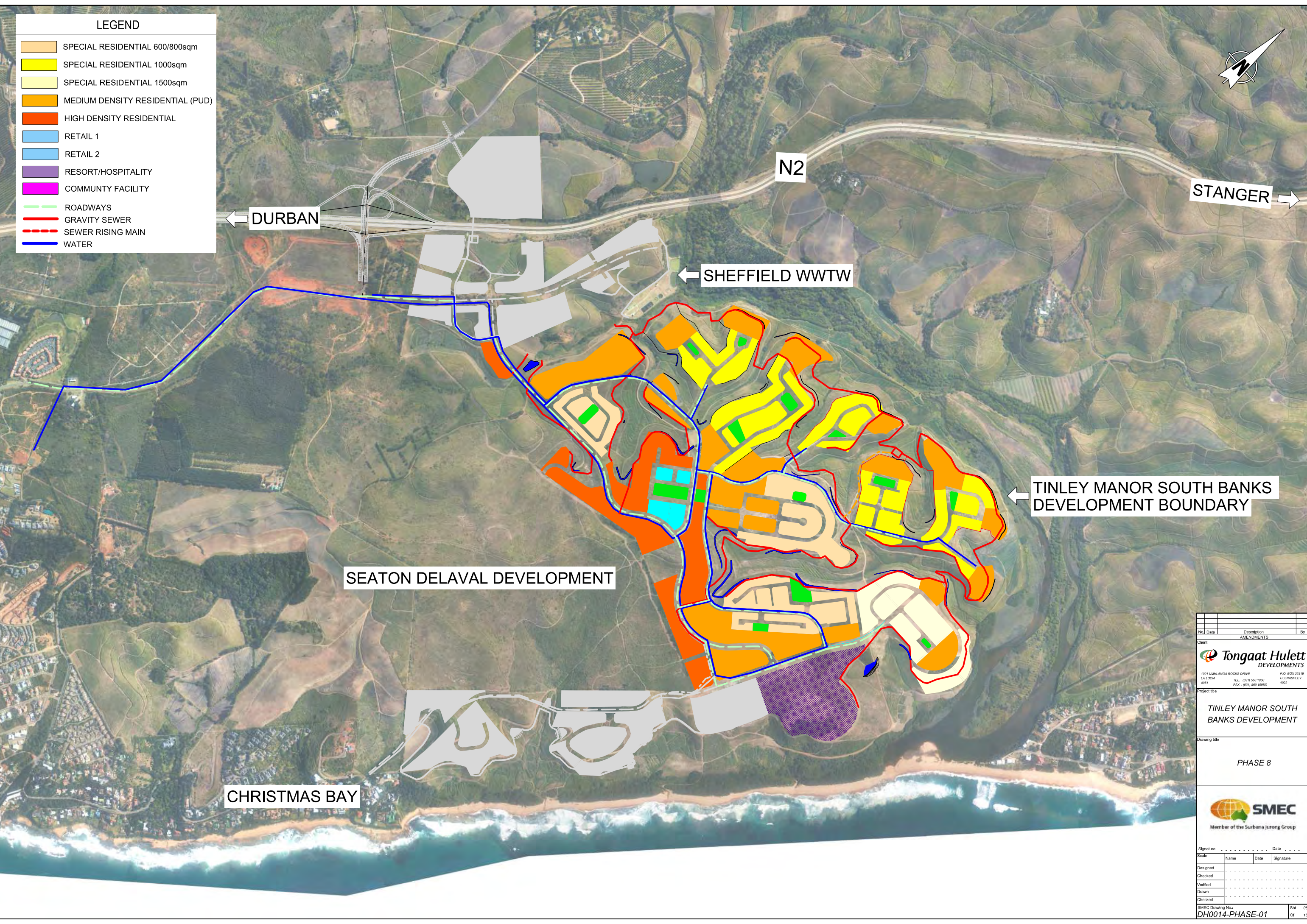
← TINLEY MANOR SOUTH BANKS DEVELOPMENT BOUNDARY

SEATON DELAVAL DEVELOPMENT

CHRISTMAS BAY

No.	Date	Description	By
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Client			
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P.O. BOX 2319 CLEVERLEY 4022			
Project title			
TINLEY MANOR SOUTH BANKS DEVELOPMENT			
Drawing title			
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 Member of the Surbana Jurong Group			
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DH0014-PHASE-01			Of 10

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	SPECIAL RESIDENTIAL 1000sqm
	SPECIAL RESIDENTIAL 1500sqm
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	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



DURBAN

N2

STANGER











SHEFFIELD WWTW

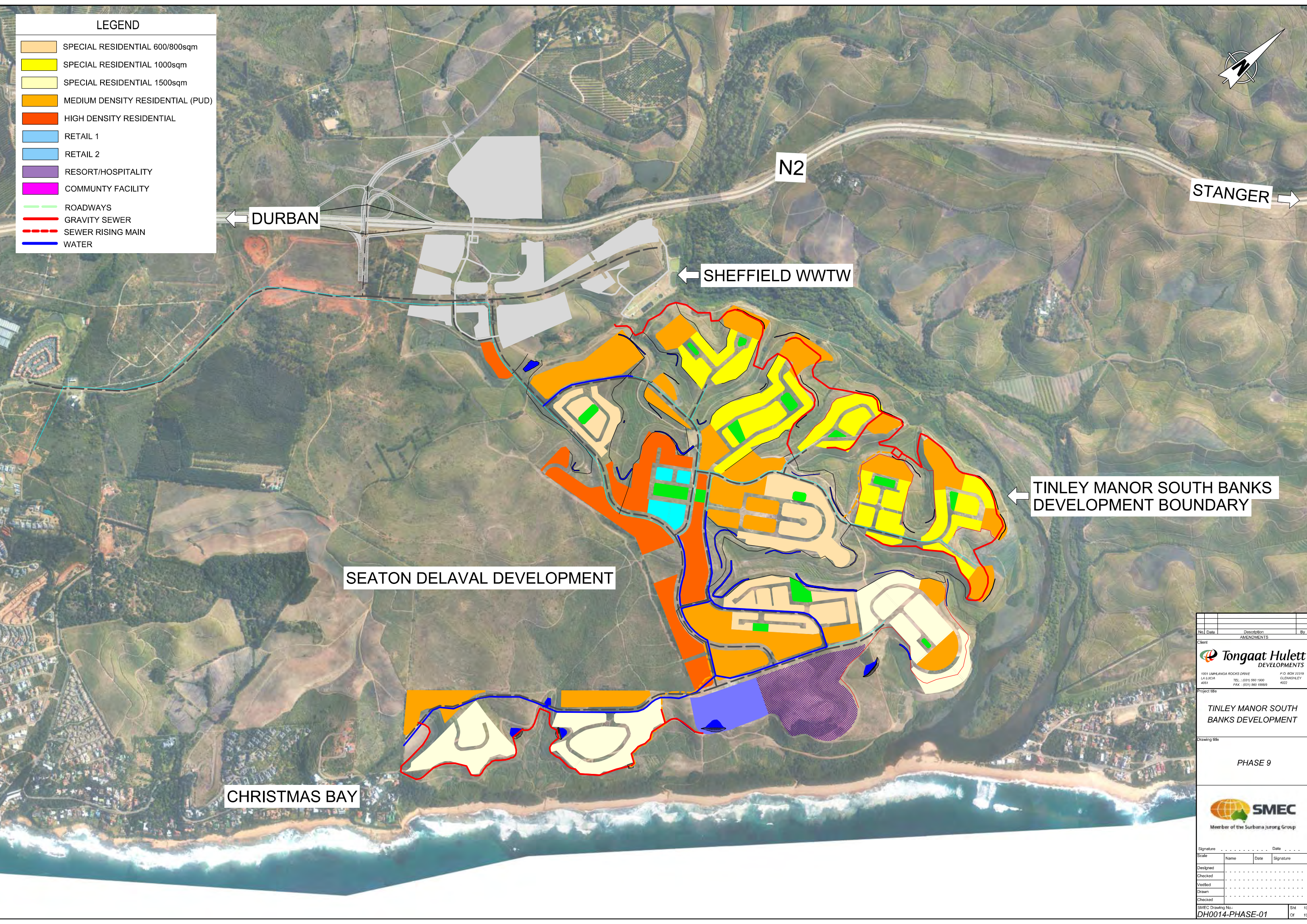
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SEATON DELAVAL DEVELOPMENT

CHRISTMAS BAY

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		AMENDMENTS	
Client			
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P.O. BOX 2319 CLEVELAND 4022			
Project title			
TINLEY MANOR SOUTH BANKS DEVELOPMENT			
Drawing title			
PHASE 8			
 Member of the Surbana Jurong Group			
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	SPECIAL RESIDENTIAL 1000sqm
	SPECIAL RESIDENTIAL 1500sqm
	MEDIUM DENSITY RESIDENTIAL (PUD)
	HIGH DENSITY RESIDENTIAL
	RETAIL 1
	RETAIL 2
	RESORT/HOSPITALITY
	COMMUNITY FACILITY
	ROADWAYS
	GRAVITY SEWER
	SEWER RISING MAIN
	WATER



DURBAN

N2

STANGER

SHEFFIELD WWTW

TINLEY MANOR SOUTH BANKS DEVELOPMENT BOUNDARY

SEATON DELAVAL DEVELOPMENT

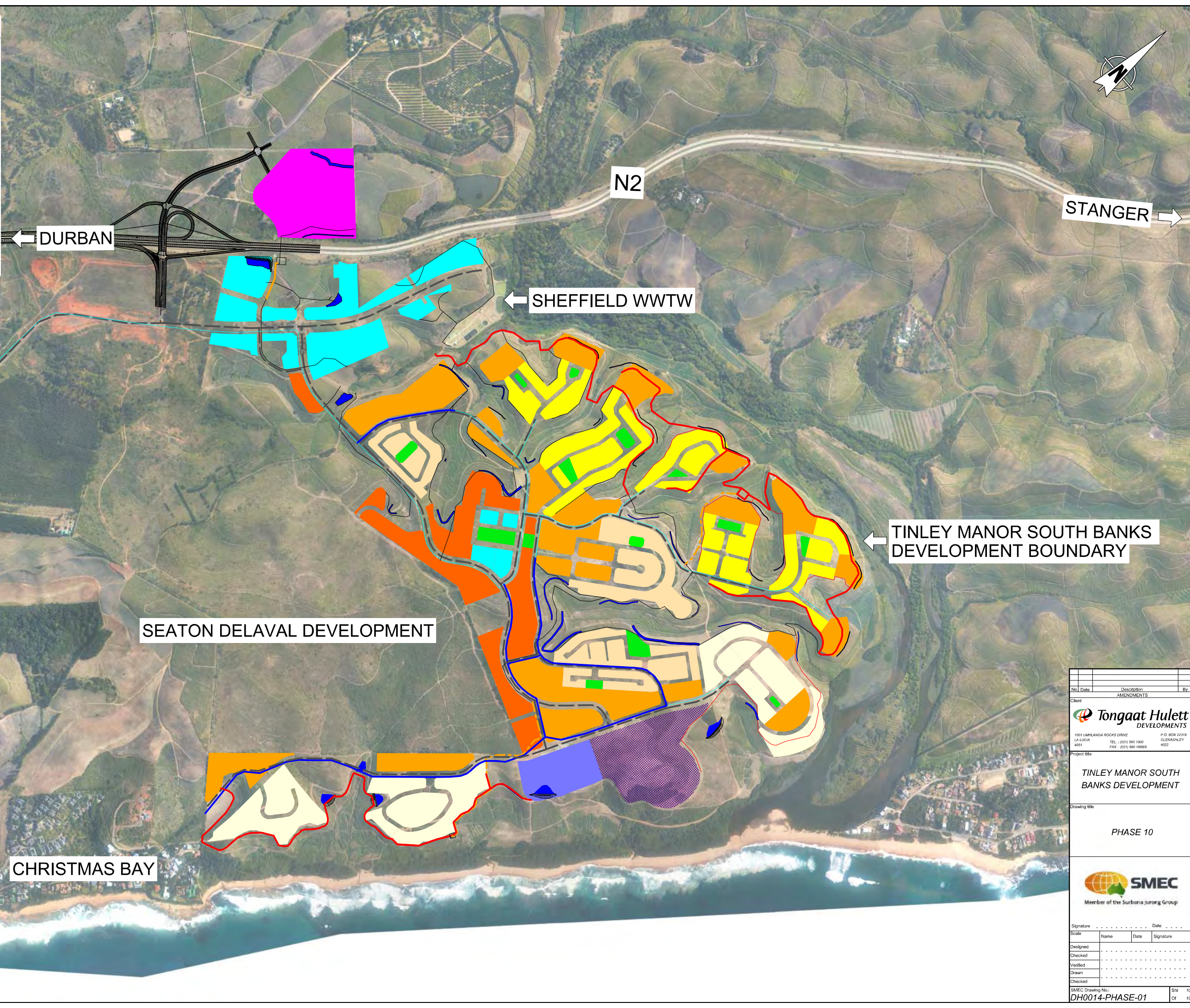
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P.O. BOX 2319 CLEVERLEY 4022			
Project title			
TINLEY MANOR SOUTH BANKS DEVELOPMENT			
Drawing title			
PHASE 9			
 Member of the Surbana Jurong Group			
Signature .....		Date .....	
Scale	Name	Date	Signature
Designed	.....	.....	.....
Checked	.....	.....	.....
Verified	.....	.....	.....
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Checked	.....	.....	.....
SMC Drawing No:			She
DH0014-PHASE-01			10
			Of
			10



**LEGEND**

- SPECIAL RESIDENTIAL 600/800sqm
- SPECIAL RESIDENTIAL 1000sqm
- SPECIAL RESIDENTIAL 1500sqm
- MEDIUM DENSITY RESIDENTIAL (PUD)
- HIGH DENSITY RESIDENTIAL
- RETAIL 1
- RETAIL 2
- RESORT/HOSPITALITY
- COMMUNITY FACILITY
- ROADWAYS
- GRAVITY SEWER
- SEWER RISING MAIN
- WATER



TINLEY MANOR SOUTH BANKS DEVELOPMENT BOUNDARY

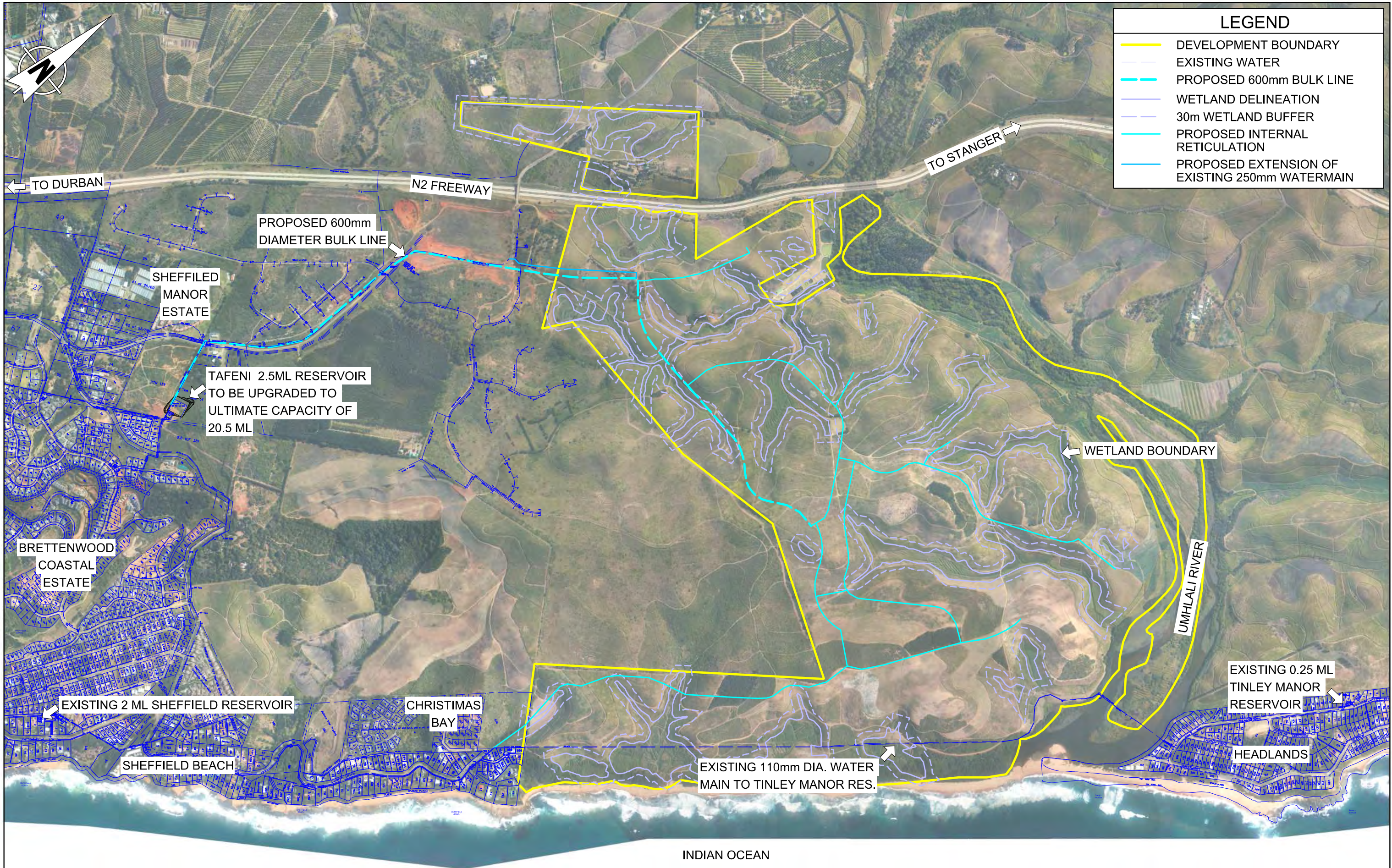
SEATON DELAVAL DEVELOPMENT

CHRISTMAS BAY

No.	Date	Description	AMENDMENTS		By		
Client							
1991 LAMRANGA ROCKS DRIVE P.O. BOX 2319 LA LUCIA 4091 TEL: (031) 550 1500 CLEVERLEY 4022 FAX: (031) 550 1999							
Project title							
TINLEY MANOR SOUTH BANKS DEVELOPMENT							
Drawing title							
PHASE 10							
Signature							
Date							
Scale	Name	Date	Signature				
Designed	.....						
Checked	.....						
Verified	.....						
Drawn	.....						
Checked	.....						
SMC Drawing No:							She
DH0014-PHASE-01							10
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							10

## APPENDIX E – BULK WATER LAYOUT

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**TINLEY MANOR SOUTH  
BULK WATER**



Client



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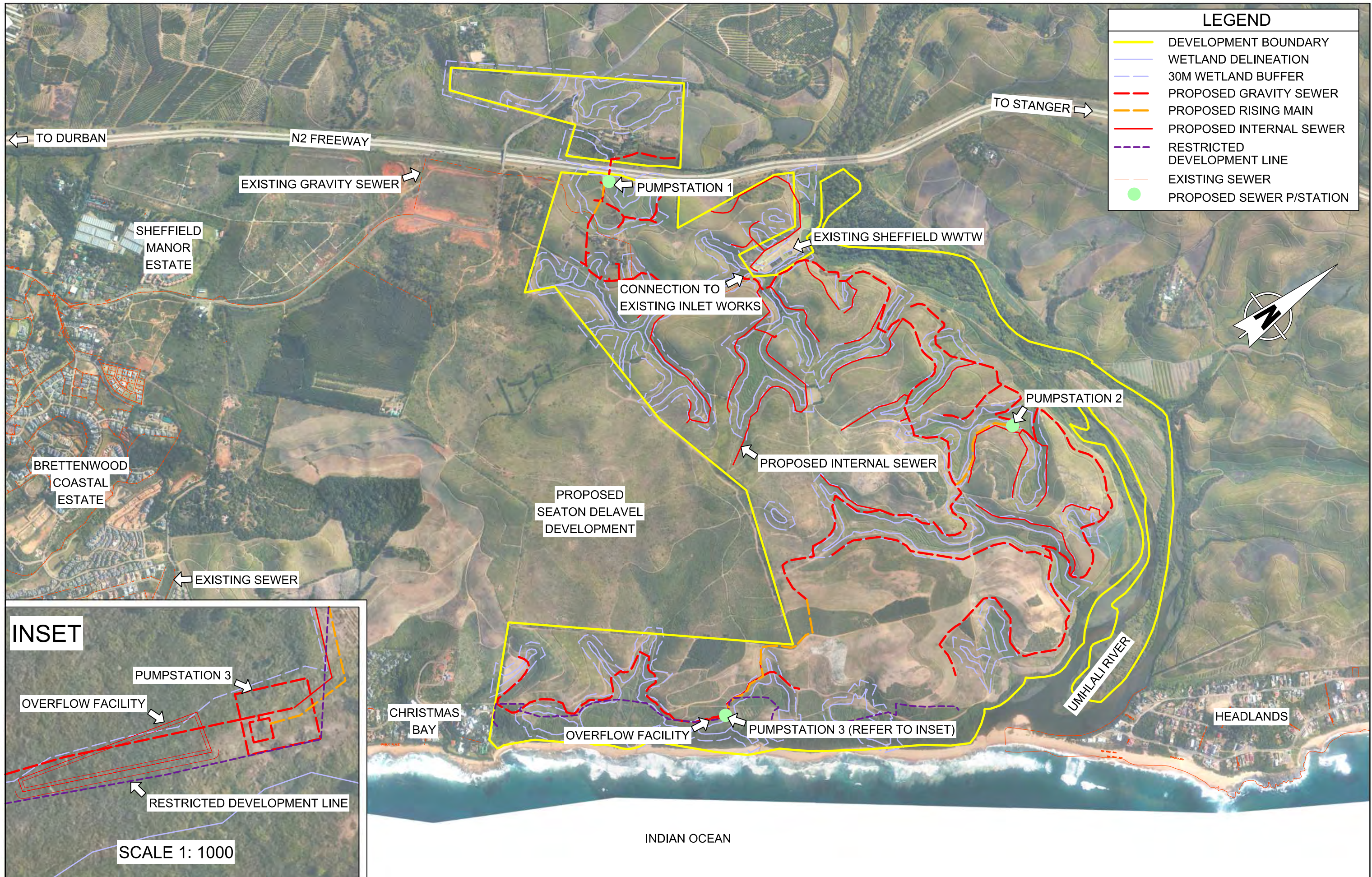
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Date  
FEB 2017

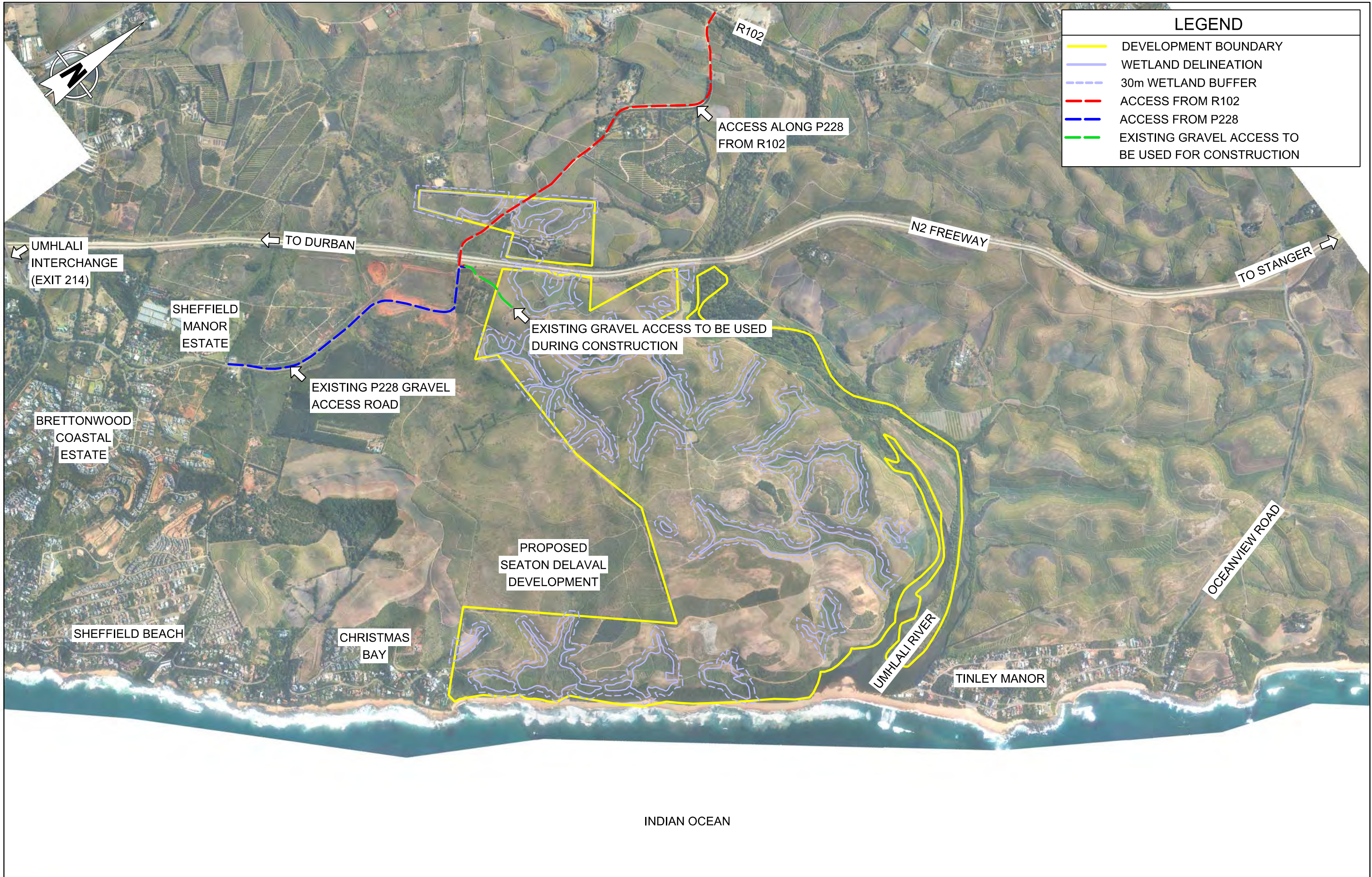
## APPENDIX F – BULK SEWER LAYOUT

---



## APPENDIX G – ROAD LAYOUTS AND ACCESS

---



**TINLEY MANOR SOUTH  
CONSTRUCTION ACCESS**



Client



Scale

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Drawing No

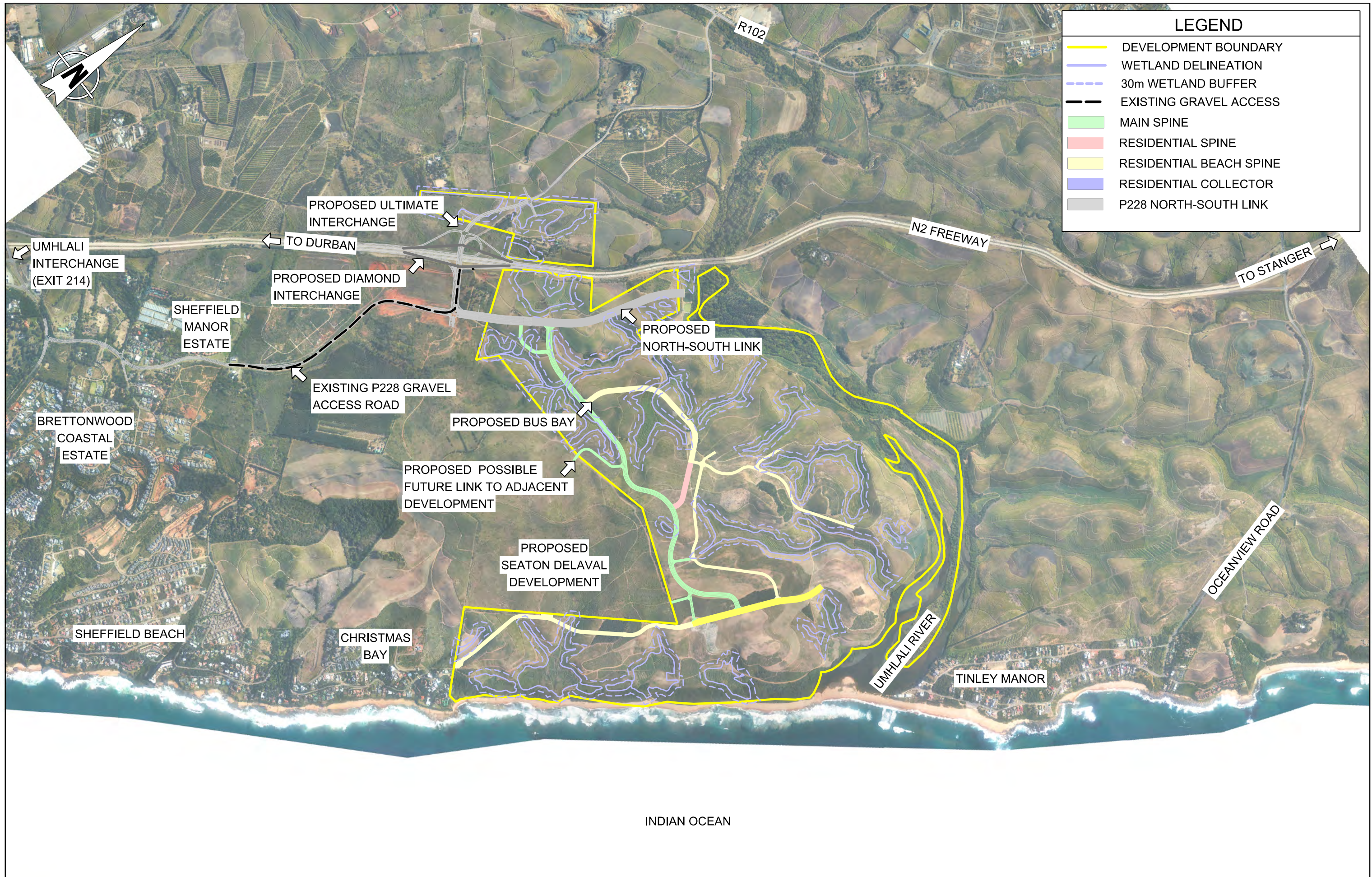
DH0014-ROADS-01

Sheet

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Date

FEB 2017



LEGEND	
	DEVELOPMENT BOUNDARY
	WETLAND DELINEATION
	30m WETLAND BUFFER
	EXISTING GRAVEL ACCESS
	MAIN SPINE
	RESIDENTIAL SPINE
	RESIDENTIAL BEACH SPINE
	RESIDENTIAL COLLECTOR
	P228 NORTH-SOUTH LINK

UMHLALI INTERCHANGE (EXIT 214)

PROPOSED ULTIMATE INTERCHANGE

TO DURBAN

PROPOSED DIAMOND INTERCHANGE

SHEFFIELD MANOR ESTATE

PROPOSED NORTH-SOUTH LINK

EXISTING P228 GRAVEL ACCESS ROAD

PROPOSED BUS BAY

PROPOSED POSSIBLE FUTURE LINK TO ADJACENT DEVELOPMENT

PROPOSED SEATON DELAVAL DEVELOPMENT

BRETTONWOOD COASTAL ESTATE

SHEFFIELD BEACH

CHRISTMAS BAY

UMHLALI RIVER

TINLEY MANOR

OCEANVIEW ROAD

N2 FREEWAY

R102

TO STANGER

INDIAN OCEAN

# TINLEY MANOR SOUTH ROAD LAYOUT



Client <b>Tongaat Hulett</b> DEVELOPMENTS	Scale 1: 20 000	Sheet 2	Date MAY 2017
	Drawing No DH0014-ROADS-01		



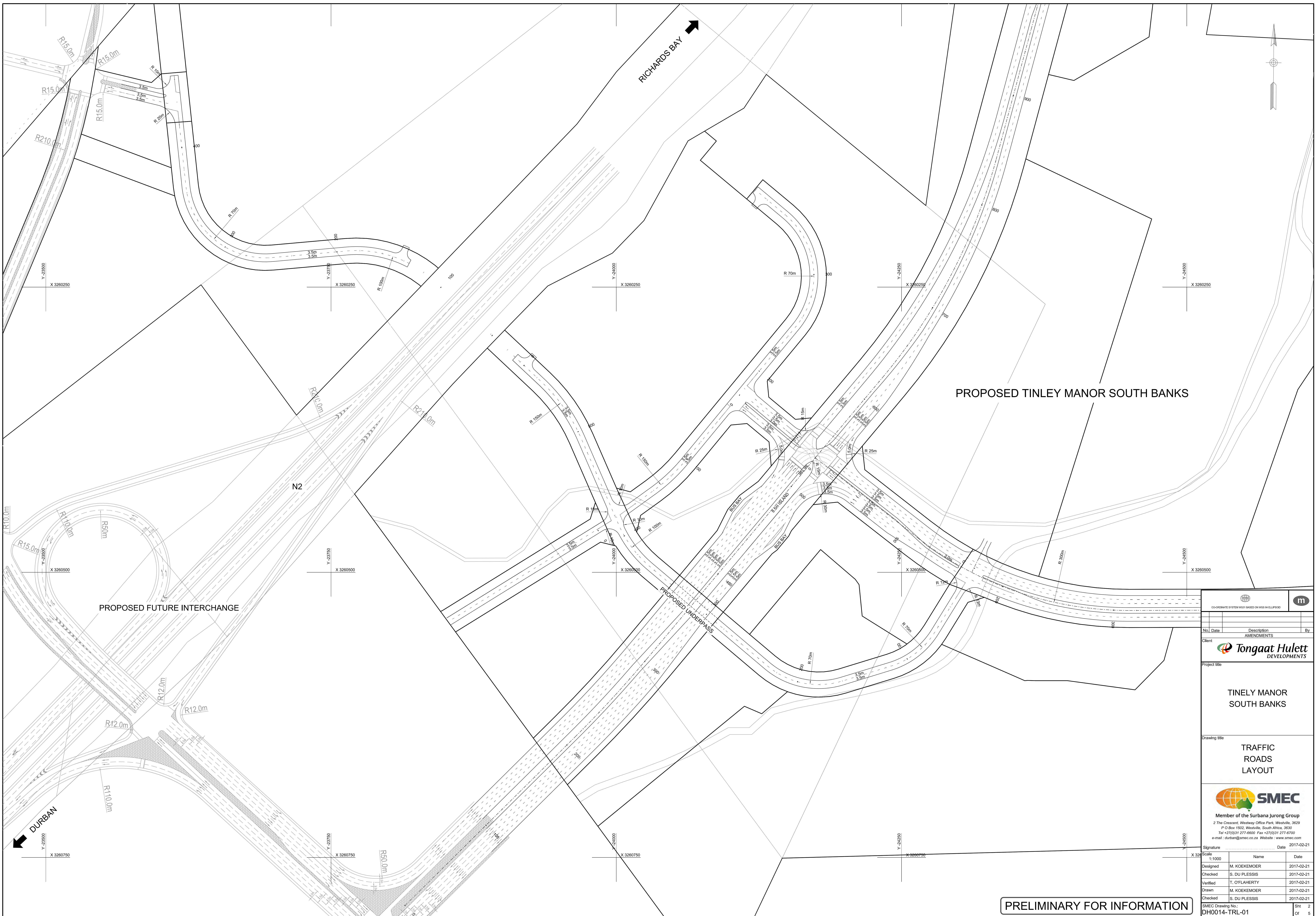
## APPENDIX H – TRAFFIC ROAD LAYOUT

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PRELIMINARY FOR INFORMATION

COORDINATE SYSTEM (MUT) BASED ON WGS 84 (ELLIPSOID)		m	
No.	Date	Description	By
AMENDMENTS			
Client			
Project title			
<p>TINELY MANOR SOUTH BANKS</p>			
Drawing title			
<p>TRAFFIC ROADS LAYOUT GENERAL LAYOUT</p>			
<p>Member of the Surbana Jurong Group 2 The Crescent, Westway Office Park, Westville, 3629 P O Box 1502, Westville, South Africa, 3630 Tel +27(0)31 277-6600 Fax +27(0)31 277-6700 e-mail: durban@smec.co.za Website: www.smec.com</p>			
Signature	Date	2017-02-21	
Scale	1:5000	Name	Date
Designed	M. KOEKEMOER	2017-02-21	
Checked	S. DU PLESSIS	2017-02-21	
Verified	T. OFLAHERTY	2017-02-21	
Drawn	M. KOEKEMOER	2017-02-21	
Checked	S. DU PLESSIS	2017-02-21	
SMEC Drawing No.: DH0014-TRL-01			Sht 1 Of 5



PROPOSED TINLEY MANOR SOUTH BANKS

PROPOSED FUTURE INTERCHANGE

PROPOSED UNDERPASS

COORDINATE SYSTEM (WGS 1984) BASED ON WGS 84 ELLIPSOID

No.	Date	Description	By
AMENDMENTS			

Client

Project title  
**TINLEY MANOR SOUTH BANKS**

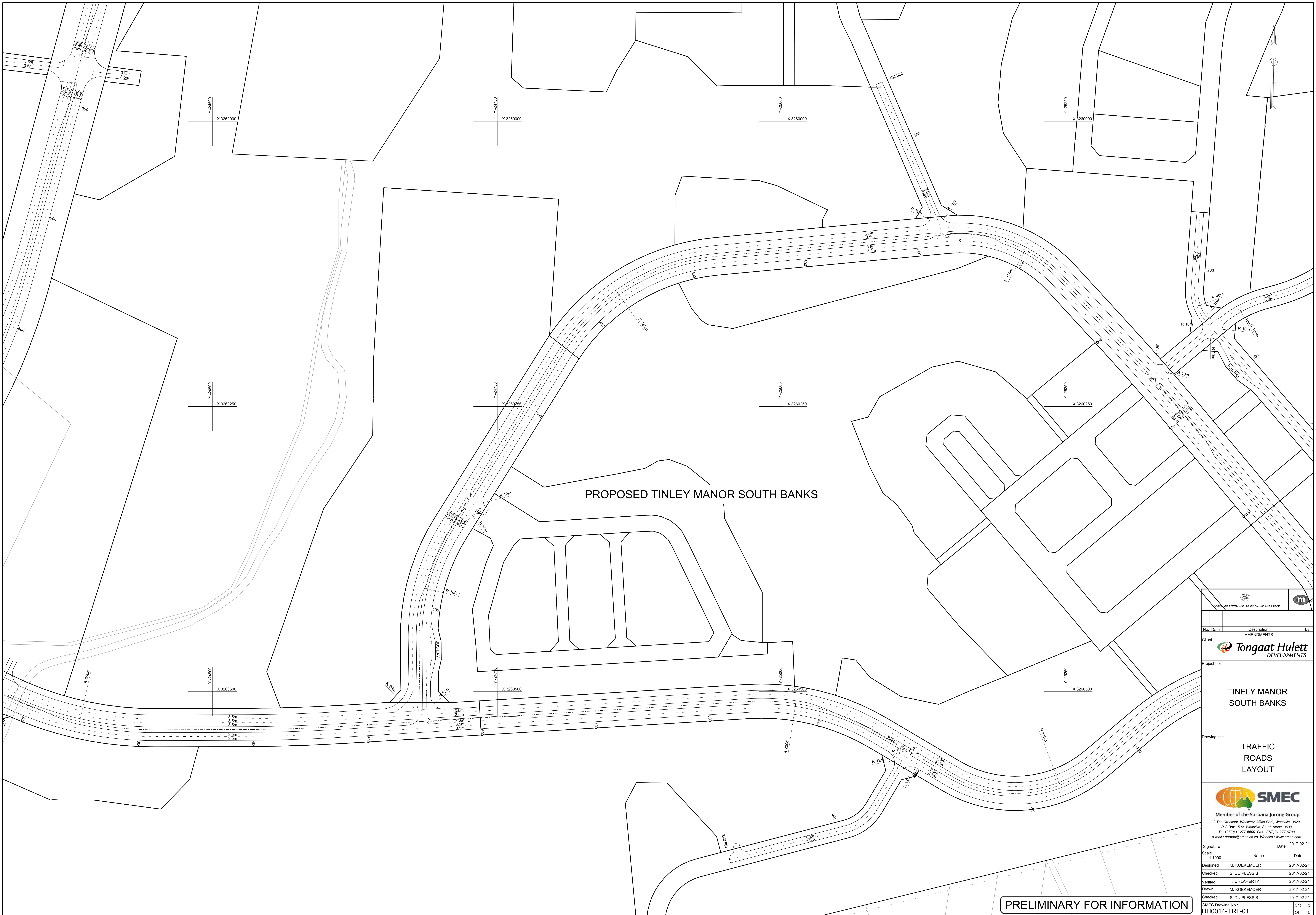
Drawing title  
**TRAFFIC ROADS LAYOUT**

**SMEC**  
 Member of the Surbana Jurong Group  
 2 The Crescent, Westway Office Park, Westville, 3629  
 P O Box 1552, Westville, South Africa, 3630  
 Tel +27(0)31 277-6600 Fax +27(0)31 277-6700  
 e-mail: durban@smec.co.za Website: www.smec.com

Signature	Name	Date
_____	M. KOEKEMOER	2017-02-21
_____	S. DU PLESSIS	2017-02-21
_____	T. OFLAHERTY	2017-02-21
_____	M. KOEKEMOER	2017-02-21
_____	S. DU PLESSIS	2017-02-21

**PRELIMINARY FOR INFORMATION**

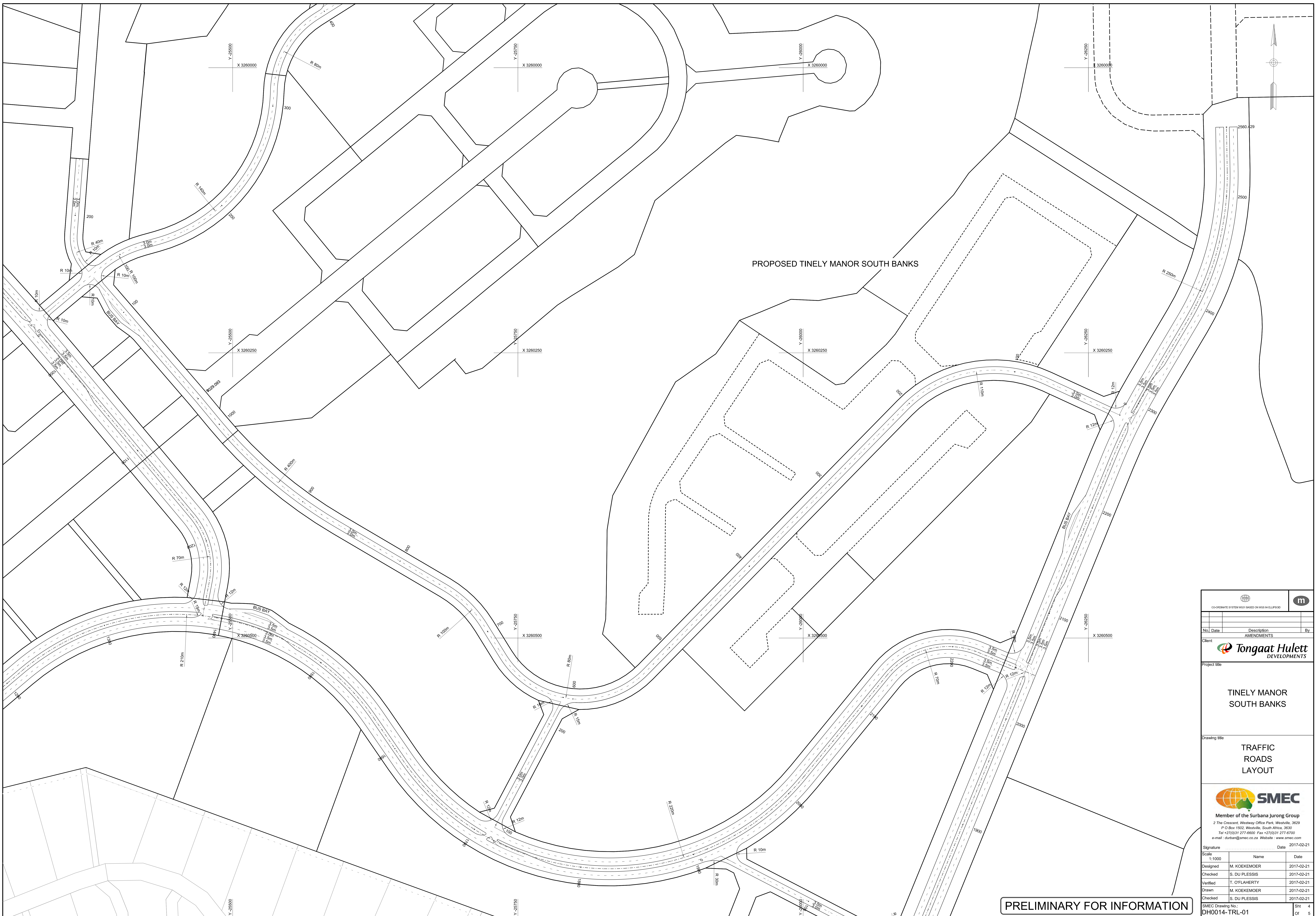
SMEC Drawing No.: **DH0014-TRL-01** | Sht 2 of 5



PROPOSED TINLEY MANOR SOUTH BANKS

PRELIMINARY FOR INFORMATION

No.		Date		Description		By	
AMENDMENTS							
Client <b>Tongaat Hulett DEVELOPMENTS</b>							
Project title <b>TINLEY MANOR SOUTH BANKS</b>							
Drawing title <b>TRAFFIC ROADS LAYOUT</b>							
 <b>SMEC</b> Member of the Surbana Jurong Group 2 The Crescent, Westway Office Park, Westville, 3629 P O Box 1502, Westville, South Africa, 3630 Tel +27(0)31 277-6600 Fax +27(0)31 277-6700 e-mail: durban@smec.co.za Website: www.smec.com							
Signature		Date		2017-02-21			
Scale	1:1000	Name		Date			
Designed		M. KOEKEMOER		2017-02-21			
Checked		S. DU PLESSIS		2017-02-21			
Verified		T. OFLAHERTY		2017-02-21			
Drawn		M. KOEKEMOER		2017-02-21			
Checked		S. DU PLESSIS		2017-02-21			
SMEC Drawing No.: <b>DH0014-TRL-01</b>						Sht	3
						Of	5

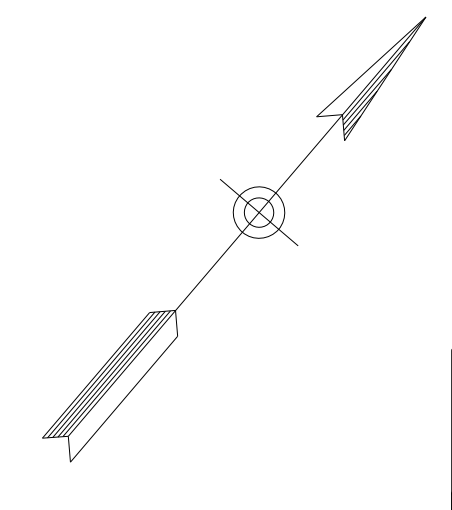
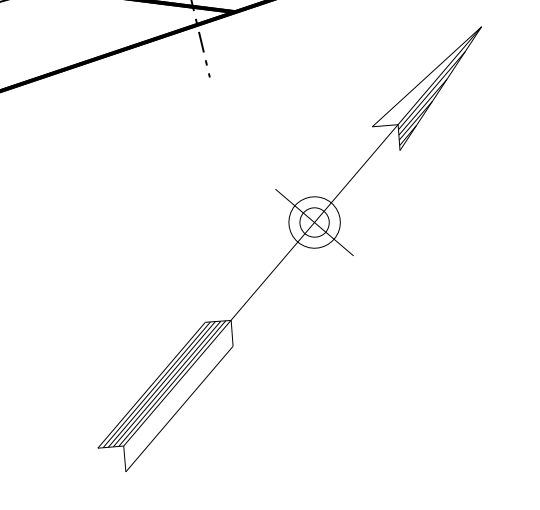


PROPOSED TINELY MANOR SOUTH BANKS

PRELIMINARY FOR INFORMATION

COORDINATE SYSTEM (WGS 1984) BASED ON GRID (M) (ELLIPSOID)		m	
No.	Date	Description	By
AMENDMENTS			
Client <b>Tongaat Hulett DEVELOPMENTS</b>			
Project title			
<b>TINELY MANOR SOUTH BANKS</b>			
Drawing title			
<b>TRAFFIC ROADS LAYOUT</b>			
Member of the Surbana Jurong Group			
2 The Crescent, Westway Office Park, Westville, 3629			
P O Box 1502, Westville, South Africa, 3630			
Tel +27(0)31 277-6600 Fax +27(0)31 277-6700			
e-mail: durben@smec.co.za Website: www.smec.com			
Signature	Date		2017-02-21
Scale	Name	Date	
1:1000	M. KOEKEMOER	2017-02-21	
Designed	S. DU PLESSIS	2017-02-21	
Checked	T. OFLAHERTY	2017-02-21	
Verified	M. KOEKEMOER	2017-02-21	
Drawn	S. DU PLESSIS	2017-02-21	
Checked	Date		2017-02-21
SMEC Drawing No.:			Sht 4
DH0014-TRL-01			Of 5

POSSIBLE FUTURE LINKAGE



COORDINATE SYSTEM MUST BE USED ON THIS DRAWING

No.	Date	Description	By
		AMENDMENTS	

Client: **Tongaat Hulett DEVELOPMENTS**

Project title: **TINELY MANOR SOUTH BANKS**

Drawing title: **TRAFFIC ROADS LAYOUT**

**SMEC**  
Member of the Surbana Jurong Group  
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Signature	Name	Date
	M. KOEKEMOER	2017-05-22
	S. DU PLESSIS	2017-05-22
	T. OFLAHERTY	2017-05-22
	M. KOEKEMOER	2017-05-22
	S. DU PLESSIS	2017-05-22

Scale: 1:1000

SMEC Drawing No.: DH0014-TRL-05

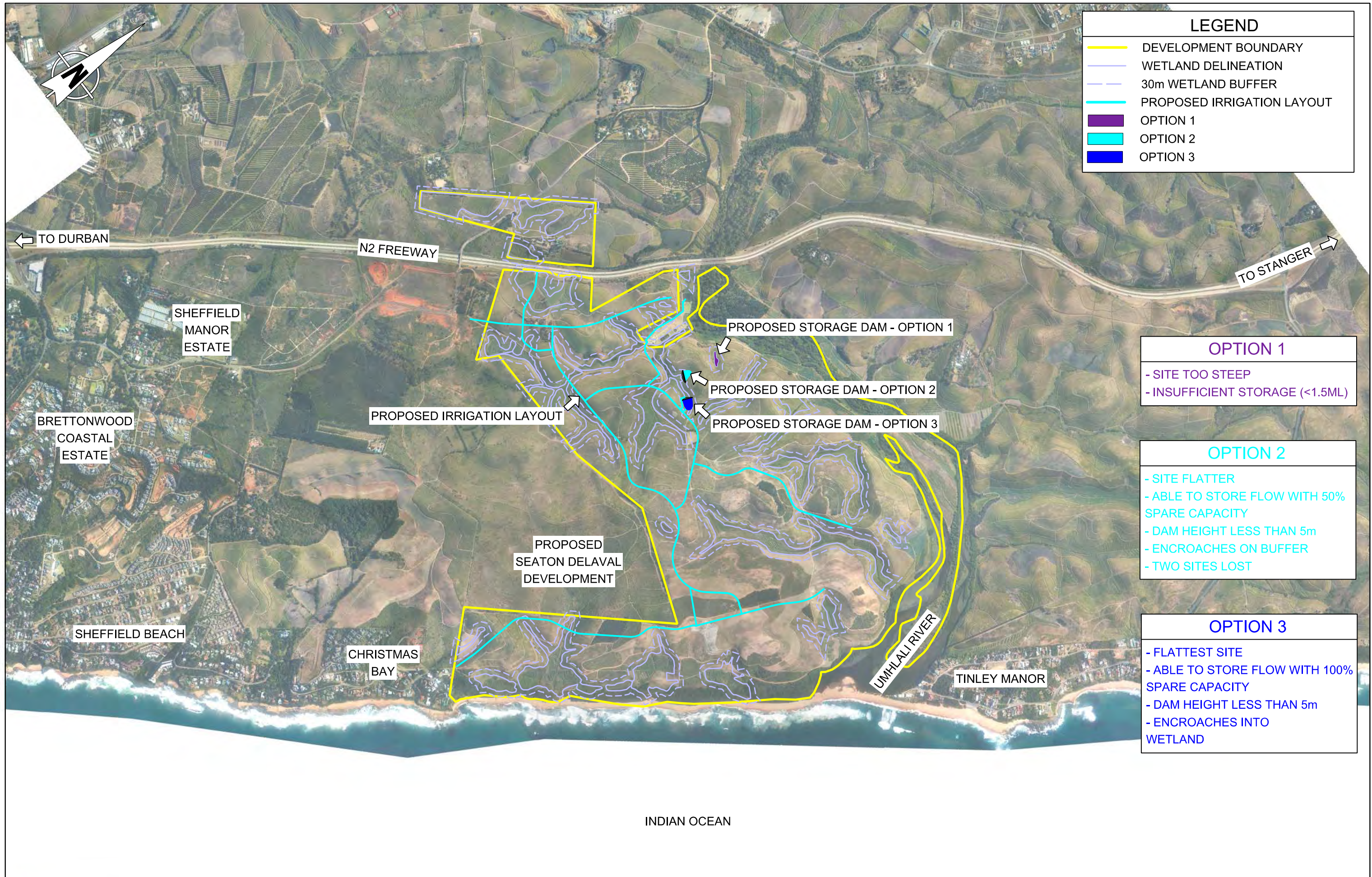
Shr 5  
Df 5

2017-05-22

PRELIMINARY FOR INFORMATION

## APPENDIX I – BULK IRRIGATION

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LEGEND	
	DEVELOPMENT BOUNDARY
	WETLAND DELINEATION
	30m WETLAND BUFFER
	PROPOSED IRRIGATION LAYOUT
	OPTION 1
	OPTION 2
	OPTION 3

OPTION 1
- SITE TOO STEEP
- INSUFFICIENT STORAGE (<1.5ML)

OPTION 2
- SITE FLATTER
- ABLE TO STORE FLOW WITH 50% SPARE CAPACITY
- DAM HEIGHT LESS THAN 5m
- ENCROACHES ON BUFFER
- TWO SITES LOST

OPTION 3
- FLATTEST SITE
- ABLE TO STORE FLOW WITH 100% SPARE CAPACITY
- DAM HEIGHT LESS THAN 5m
- ENCROACHES INTO WETLAND

← TO DURBAN

N2 FREEWAY

TO STANGER →

SHEFFIELD MANOR ESTATE

BRETTONWOOD COASTAL ESTATE

SHEFFIELD BEACH

CHRISTMAS BAY

TINLEY MANOR

PROPOSED IRRIGATION LAYOUT

PROPOSED SEATON DELAVAL DEVELOPMENT

PROPOSED STORAGE DAM - OPTION 1

PROPOSED STORAGE DAM - OPTION 2

PROPOSED STORAGE DAM - OPTION 3

UMHLALI RIVER

INDIAN OCEAN



# TINLEY MANOR SOUTH IRRIGATION LAYOUT

Client



Scale  
1: 20 000

Drawing No  
DH0014-IRRIGATION-01

Sheet  
1

Date  
MARCH 2017



## APPENDIX J – WATER DEMAND CALCULATIONS

---

**TINLEY MANOR SOUTH TOTAL WATER DEMAND  
TABLE 1**

NAME	AREA (Ha)	FAR	TOTAL BULK (m <sup>3</sup> )	RESIDENTIAL BULK (m <sup>3</sup> )	RESIDENTIAL DENSITY (units/ha)	AVERAGE UNIT SIZE (m <sup>2</sup> )	RESIDENTIAL UNITS (No)	COMMERCIAL BULK (m <sup>3</sup> )	TOTAL OTHER FLOOR AREA (m <sup>2</sup> )	RESIDENTIAL ADD (M <sup>3</sup> /day)	COMMERCIAL ADD (M <sup>3</sup> /day)	TOTAL ADD (M <sup>3</sup> /day)
Retail 1 (MU) (75-25 Split)	20.46	0.50	102 294	76 721	-	60	1 279	25 574	-	1.47	0.18	1.65
Retail 2	5.36	0.15	8 035	-	-	-	-	8 035	-	-	0.06	0.06
Special Residential 1500m <sup>2</sup>	24.56	0.50	122 795	122 795	6	-	147	-	-	0.20	-	0.20
Special Residential 1000m <sup>2</sup>	23.72	0.50	118 580	118 580	10	-	237	-	-	0.33	-	0.33
Special Residential 600/800m <sup>2</sup>	18.55	0.50	92 755	92 755	12 to 16	-	260	-	-	0.36	-	0.36
Medium Density (MDR)	44.78	0.15	67 173	67 173	25	60	1 120	-	-	1.29	-	1.29
High Density (HDR) (90-10 Split)	3.56	0.375	13 347	12 013	75	45	267	1 335	-	0.31	0.01	0.32
High Density	14.66	0.375	54 971	54 971	75	45	1 222	-	-	1.40	-	1.40
Resort	12.00	0.25	29 991	-	-	-	-	-	29 991	-	0.39	0.39
Community	12.43	0.35	43 517	-	-	-	-	-	43 517	-	0.31	0.31
<b>TOTALS</b>	<b>180.07</b>	<b>-</b>	<b>653 458</b>	<b>545 007</b>	<b>-</b>	<b>-</b>	<b>4 531</b>	<b>34 944</b>	<b>73 508</b>	<b>5.36</b>	<b>0.95</b>	<b>6.31</b>
<b>STORAGE REQUIRED</b>	<b>12.62</b>	<b>ML</b>										

**BASE DATA**

Retail 1 (MU) Commercial	6.25	ℓ/m <sup>2</sup> /day	
Retail 1 (MU) Residential	1000	ℓ/day/unit	Mixed retail, office and residential node
Retail 2	6.25	ℓ/m <sup>2</sup> /day	Low Impact Retail and Entertainment, Mixed Use for Beach Node
Special Residential 1500m <sup>2</sup>	1200	ℓ/day/unit	
Special Residential 1000m <sup>2</sup>	1200	ℓ/day/unit	
Special Residential 600/800m <sup>2</sup>	1200	ℓ/day/unit	
Medium Density (MDR)	1000	ℓ/day/unit	
High Density (HDR) Residential	1000	ℓ/day/unit	Planned unit development with 10% commercial
High Density Commercial	6.25	ℓ/m <sup>2</sup> /day	
Resort	11.2	ℓ/m <sup>2</sup> /day	WRC Document
Education	6.25	ℓ/m <sup>2</sup> /day	
Losses (15%)	1.15	-	

**NB: Based on latest land use schedule dated March 2017 , Drawing No: T01.DUR.000121/03/14-03  
Base demands from Siza Water's Master Plan**

**TINLEY MANOR PHASING - WATER DEMAND  
TABLE 2**

LAND USE	BULK AREA (m <sup>2</sup> )	NO. OF UNITS	ADD (M <sup>3</sup> /day)	Cumulative Total (M <sup>3</sup> /day)
<b>PHASE 1</b>				
Special Residential 600/800m <sup>2</sup>		52	0.08	
Medium Density Residential		136	0.16	
High Density Residential		81	0.09	
<b>TOTAL</b>	<b>0</b>	<b>269</b>	<b>0.33</b>	<b>0.33</b>
<b>PHASE 2</b>				
Special Residential 600/800m <sup>2</sup>		106	0.15	
Medium Density Residential		114	0.13	
<b>TOTAL</b>		<b>220</b>	<b>0.28</b>	<b>0.61</b>
<b>PHASE 3</b>				
Special Residential 1000m <sup>2</sup>		112	0.15	
Medium Density Residential		207	0.24	
<b>TOTAL</b>		<b>319</b>	<b>0.39</b>	<b>1.00</b>
<b>PHASE 4</b>				
High Density Residential (Town Centre)	1 338	268	0.32	
High Density Residential		564	0.65	
Retail 1 - Mixed Use	2 597	130	0.17	
<b>TOTAL</b>	<b>3 935</b>	<b>962</b>	<b>1.13</b>	<b>2.13</b>
<b>PHASE 5</b>				
Special Residential 1000m <sup>2</sup>		125	0.17	
Medium Density Residential		228	0.26	
<b>TOTAL</b>		<b>353</b>	<b>0.43</b>	<b>2.57</b>
<b>PHASE 6</b>				
High Density Residential		578	0.66	
Medium Density Residential		199	0.23	
<b>TOTAL</b>		<b>777</b>	<b>0.89</b>	<b>3.46</b>
<b>PHASE 7</b>				
Special Residential 600/800m <sup>2</sup>		102	0.14	
Medium Density Residential		26	0.03	
<b>TOTAL</b>		<b>128</b>	<b>0.17</b>	<b>3.63</b>
<b>PHASE 8</b>				
Medium Density Residential		63	0.07	
Single Residential 1500m <sup>2</sup>		58	0.08	
Resort/Hospitality	29 991		0.39	
<b>TOTAL</b>	<b>29 991</b>	<b>121</b>	<b>0.54</b>	<b>4.17</b>
<b>PHASE 9</b>				
Single Residential 1500m <sup>2</sup>		89	0.12	
Medium Density Residential		146	0.17	
Retail 2	8 035	-	0.06	
<b>TOTAL</b>	<b>8 035</b>	<b>235</b>	<b>0.35</b>	<b>4.52</b>
<b>PHASE 10</b>				
Retail 1 - Mixed Use	22 850	1 142	1.48	
Community Facility	43 517	-	0.31	
<b>TOTAL</b>		<b>1 142</b>	<b>1.79</b>	<b>6.31</b>
<b>DEVELOPMENT TOTAL</b>		<b>4 526</b>		<b>6.31</b>

## APPENDIX K – SEWER FLOW CALCULATIONS

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**TINLEY MANOR SOUTH TOTAL SEWER FLOW  
TABLE 3**

NAME	AREA (Ha)	FAR	TOTAL BULK (m <sup>2</sup> )	RESIDENTIAL BULK (m <sup>2</sup> )	RESIDENTIAL DENSITY (units/ha)	AVERAGE UNIT SIZE (m <sup>2</sup> )	RESIDENTIAL UNITS (No)	COMMERCIAL BULK (m <sup>2</sup> )	TOTAL OTHER FLOOR AREA (m <sup>2</sup> )	RESIDENTIAL ADD (M <sup>3</sup> /day)	COMMERCIAL ADD (M <sup>3</sup> /day)	TOTAL ADD (M <sup>3</sup> /day)
Retail 1 (MU) (75-25 Split)	20.46	0.50	102 294	76 721	-	60	1 279	25 574	-	1.16	0.15	1.31
Retail 2	5.36	0.15	8 035	-	-	-	-	8 035	-	-	0.05	0.05
Special Residential 1500m <sup>2</sup>	24.56	0.50	122 795	122 795	6	-	147	-	-	0.16	-	0.16
Special Residential 1000m <sup>2</sup>	23.72	0.50	118 580	118 580	10	-	237	-	-	0.26	-	0.26
Special Residential 600/800m <sup>2</sup>	18.55	0.50	92 755	92 755	12 to 16	-	260	-	-	0.28	-	0.28
Medium Density (MDR)	44.78	0.15	67 173	67 173	25	60	1 120	-	-	1.02	-	1.02
High Density (HDR) (90-10 Split)	3.56	0.375	13 347	12 013	75	45	267	1 335	-	0.24	0.01	0.25
High Density	14.66	0.375	54 971	54 971	75	45	1 222	-	-	1.11	-	1.11
Resort	12.00	0.25	29 991	-	-	-	-	-	29 991	-	0.35	0.35
Community	12.43	0.35	43 517	-	-	-	-	-	43 517	-	0.28	0.28
<b>TOTALS</b>	<b>180.07</b>	<b>-</b>	<b>653 458</b>	<b>545 007</b>	<b>-</b>	<b>-</b>	<b>4 531</b>	<b>34 944</b>	<b>73 508</b>	<b>4.24</b>	<b>0.83</b>	<b>5.07</b>

BASE DATA		
Retail 1 (MU) Commercial	4.38	ℓ/m <sup>2</sup> /day
Retail 1 (MU) Residential	700	ℓ/day/unit
Retail 2	4.38	ℓ/m <sup>2</sup> /day
Special Residential 1500m <sup>2</sup>	840	ℓ/day/unit
Special Residential 1000m <sup>2</sup>	840	ℓ/day/unit
Special Residential 600/800m <sup>2</sup>	840	ℓ/day/unit
Medium Density (MDR)	700	ℓ/day/unit
High Density (HDR) Residential	700	ℓ/day/unit
High Density Commercial	4.38	ℓ/m <sup>2</sup> /day
Resort	8.96	ℓ/m <sup>2</sup> /day
Education	5	ℓ/m <sup>2</sup> /day
Infiltration (30%)	1.3	-

Mixed retail, office and residential node  
 Low Impact Retail and Entertainment, Mixed Use for Beach Node  
 Planned unit development with 10% commercial  
 WRC Document

**NB: Based on latest land use schedule dated March 2017 , Drawing No: T01.DUR.000121/03/14-03**

**Base demands from Siza Water's Master Plan**

**TINLEY MANOR PHASING - SEWER FLOW  
TABLE 4**

LAND USE	BULK AREA (m <sup>2</sup> )	NO. OF UNITS	ADD (M <sup>3</sup> /day)	Cumulative Total (M <sup>3</sup> /day)
<b>PHASE 1</b>				
Special Residential 600/800m <sup>2</sup>		52	0.06	
Medium Density Residential		136	0.12	
High Density Residential		81	0.07	
<b>TOTAL</b>	<b>0</b>	<b>269</b>	<b>0.25</b>	<b>0.25</b>
<b>PHASE 2</b>				
Special Residential 600/800m <sup>2</sup>		106	0.12	
Medium Density Residential		114	0.10	
<b>TOTAL</b>		<b>220</b>	<b>0.22</b>	<b>0.47</b>
<b>PHASE 3</b>				
Special Residential 1000m <sup>2</sup>		112	0.12	
Medium Density Residential		207	0.19	
<b>TOTAL</b>		<b>319</b>	<b>0.31</b>	<b>0.78</b>
<b>PHASE 4</b>				
High Density Residential (Town Centre)	1 338	268	0.25	
High Density Residential		564	0.51	
Retail 1 - Mixed Use	2 597	130	0.13	
<b>TOTAL</b>	<b>3 935</b>	<b>962</b>	<b>0.90</b>	<b>1.68</b>
<b>PHASE 5</b>				
Special Residential 1000m <sup>2</sup>		125	0.14	
Medium Density Residential		228	0.21	
<b>TOTAL</b>		<b>353</b>	<b>0.34</b>	<b>2.03</b>
<b>PHASE 6</b>				
High Density Residential		578	0.53	
Medium Density Residential		199	0.18	
<b>TOTAL</b>		<b>777</b>	<b>0.71</b>	<b>2.73</b>
<b>PHASE 7</b>				
Special Residential 600/800m <sup>2</sup>		102	0.11	
Medium Density Residential		26	0.02	
<b>TOTAL</b>		<b>128</b>	<b>0.14</b>	<b>2.87</b>
<b>PHASE 8</b>				
Medium Density Residential		63	0.06	
Single Residential 1500m <sup>2</sup>		58	0.06	
Resort/Hospitality	29 991		0.35	
<b>TOTAL</b>	<b>29 991</b>	<b>121</b>	<b>0.47</b>	<b>3.34</b>
<b>PHASE 9</b>				
Single Residential 1500m <sup>2</sup>		89	0.10	
Medium Density Residential		146	0.13	
Retail 2	8 035	-	0.05	
<b>TOTAL</b>	<b>8 035</b>	<b>235</b>	<b>0.28</b>	<b>3.61</b>
<b>PHASE 10</b>				
Retail 1 - Mixed Use	22 850	1 142	1.17	
Community Facility	43 517	-	0.28	
<b>TOTAL</b>		<b>1 142</b>	<b>1.45</b>	<b>5.07</b>
<b>DEVELOPMENT TOTAL</b>		<b>4 526</b>		<b>5.07</b>

## APPENDIX L – CORRESPONDENCE WITH SSW

---

## Moodley, Radeshni

---

**From:** Nikilesh Misra <Nikilesh.Misra@sembcorp.com>  
**Sent:** 08 December 2015 03:32 PM  
**To:** Moodley, Radeshni  
**Cc:** Cunningham, Gregg; Ellis, Jonathan; Sheritha Parthab; Roshan Chalithar  
**Subject:** RE: DH0002-1-2-1:TINLEY MANOR SERVICING


Hello Radeshni

Please see below amendments to your summary.

### Regards

**Nicky Misra**  
**Project Manager**




 [nikilesh.misra@sembcorp.com](mailto:nikilesh.misra@sembcorp.com)  
Suite 1-4,Reypark House, Rey's Place, Avondale, Ballito  
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 +2732 946 7202

 +2783 3099467

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---

**From:** Moodley, Radeshni [mailto:Radeshni.Moodley@smec.com]  
**Sent:** 08 December 2015 09:00 AM  
**To:** Nikilesh Misra  
**Cc:** Cunningham, Gregg; Ellis, Jonathan  
**Subject:** DH0002-1-2-1:TINLEY MANOR SERVICING

Hi Nicky,

Thanks for meeting with us. As per our discussion yesterday, the following is noted with regard to the Tinley Manor South Banks Development:

### Water:

- Water for the first phase of the development can be made available by the extension of the existing 250mm diameter from Taffeni Reservoir. **We will need confirmation of the demand for the 1<sup>ST</sup> Phase before committing to this.**
- Thereafter the Taffeni reservoir will require upsizing to supply the following phases. There is sufficient space available to upsize the reservoir to a ultimate capacity of 7.5ML. **Existing Reservoir is 2.5ML. Design has been completed to construct in 2 x 2.5ML Modules**



- The construction of the new Seaton Delaval Reservoir is uncertain at present due to the uncertainty of the development. **Sembcorp will have to probably redraft a new Services Agreement as there will be new owners and the usage of the Seaton Delaval Development may change.**
- The existing 110mm diameter watermain that supplies Tinley Manor Reservoir can be abandoned however a new supply line from the Umgeni Bulk line to Tinley Manor Reservoir would need to be constructed. **Umgeni has given approval for a connection of their feeder line. The length of main required to the Tinley Manor Reservoir is approximately 2.5km.**

## Sewer

- Sewer can be pumped or gravitate to the existing Sheffield WWTW
- Current flow at the treatment works is approx. 0.5ML
- Once Hugh Dent P/Station is complete flow at the WWTW will increase.
- The inlet is designed to accommodate 18 MI/day and treatment capacity is 6MI/day but can be increased to the ultimate of 18MI/day.
- An option is also available to gravitate sewer to the Christmas Bay P/station however this may require demolishing and upsizing the existing pumphouse. Furthermore the route of the rising main to Christmas Bay will be quite complicated. **The sump may need to be upsized however there is not much space available and the site is within the 100m high water mark which will pose additional problems in getting approvals. The rising main from Christmas Bay has not been installed as yet**

I trust the above is in order, please feel free to add on anything I've omitted.

Kind Regards,

**Radeshni Moodley | Engineer, Urban Development**  
**SMEC South Africa**

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**SMEC SNOWY MOUNTAINS ENGINEERING CORPORATION**

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**MEETING TITLE: Bulk Water and Sewer Discussion No. 3**

**VENUE:** Siza Water

**START TIME:** 09:00

**MEETING DATE:** 2016-11-02

**FINISH TIME:** 10:00

**DISTRIBUTION:** All Attendees

**RECORDER:** SdP **CHECKED BY:** MK

	NAME		ORGANISATION	NAME		ORGANISATION
<b>ATTENDEES</b>	Nikilesh Misra	NM	Sembcorp Siza Water	Siebren du Plessis	SdP	SMEC
	Martin Koekemoer	MK	SMEC			
<b>APOLOGIES</b>	Radeshni Moodley	RM	SMEC			

### RECORD OF DISCUSSION

ITEM	DETAILS	ACTION BY	DATE
<b>3.1</b>	<b>INTRODUCTION</b>		
	SMEC is responsible for the civil services of the Tinley Manor South Banks (TMSB) development. This meeting is the 3rd between SMEC and Siza Water to discuss bulk services for the development	Note	
<b>3.2</b>	<b>BULK WATER</b>		
3.2.1	Tafeni Reservoir		
	SMEC presented a proposed new layout for upgrades to the existing Tafeni Reservoir. This includes 4 new cells of 4.5Ml each. The ultimate reservoir size will be 20.5Ml to supply the entire Tinley Manor South Banks Development and accommodate for the initially planned 7.5Ml Tafeni Reservoir. No Land Acquisition is required	Note	
	NM agreed to the proposed layout in principle. TMSB will be serviced from the expanded Tafeni Reservoir. SMEC to comment on phasing of the upgrades and forward copies of the proposed layout to NM in order for SSW operations to comment.	SdP	
<b>3.3</b>	<b>Bulk Sewer</b>		
3.3.1	Pump Stations		
	In order to service the education site on the west of the N2, a gravity main through Adrian Reynolds' property is required. AR is not in agreement with this. The alternative will be a 3rd pump station	Note	
	Although not ideal, SSW will accept this should no alternatives be available. Engineering Services Report to reflect this. Education site development is anticipated in Phase 10 only.	SdP	
	Expropriation of the servitudes is also an option in future that SSW can follow.	Noted	
<b>3.4</b>	<b>Information Requested</b>		
3.4.1	SMEC requested the Sheffield WWTW design report. NM to send to SdP	NM	

<b>RECORD OF DISCUSSION</b>			
<b>ITEM</b>	<b>DETAILS</b>	<b>ACTION BY</b>	<b>DATE</b>
3.4.2	SMEC to contact Koos Duvenhage for Water quality records from Sheffield WWTW	SdP	
3.4.3	The expansion to the Palm Lakes Reservoir is done by ILembe. Contact details for ILembe representatives provided by NM. Dumisane - 0835628398. Elias Bengu - 0835628292	Info	

**MEETING TITLE:** Bulk Water and Sewer Discussion No. 4

**VENUE:** Siza Water

**START TIME:** 08:30

**MEETING DATE:** 2016-11-11

**FINISH TIME:** 09:30

**DISTRIBUTION:** All Attendees

**RECORDER:** SdP **CHECKED BY:**

	NAME		ORGANISATION	NAME		ORGANISATION
<b>ATTENDEES</b>	Nikilesh Misra	NM	Sembcorp Siza Water	Siebren du Plessis	SdP	SMEC
<b>APOLOGIES</b>	Radeshni Moodley	RM	SMEC	Martin Koekemoer	MK	SMEC
	Tony Ferreira	TF	SMEC	Lusanda Sineke	LS	SMEC

### RECORD OF DISCUSSION

ITEM	DETAILS	ACTION BY	DATE
<b>4.1</b>	<b>INTRODUCTION</b>		
	SMEC is responsible for the civil services of the Tinley Manor South Banks (TMSB) development. This meeting is the 4th between SMEC and Siza Water to discuss the design criteria to be used for the preliminary design of the upgrades to the Tafeni Reservoir. SMEC's current appointment is for Stages 1&2 as per the ECSA guidelines.	Note	
<b>4.2</b>	<b>SERVICE LEVEL AGREEMENT</b>		
4.2.1	NM stated that THD will be required to construct all services required for the Tinley Manor South Banks Development, including Bulk Services. This will include the design and construction of the Upgrades for the existing Tafeni Reservoir and associated infrastructure	Note	
4.2.2	A Service Level Agreement between THD and SSW will be drafted by Sembcorp Siza Water (SSW), containing the abovementioned condition	NM	
<b>4.3</b>	<b>Design Specifications</b>		
4.3.1	Common walls will be assumed in the design of the reservoir.	Note	
4.3.2	One outlet will be required for the new upgraded reservoir.	Note	
4.3.3	Each Cell to have it's own side inlet, just above freeboard level	Note	
4.3.4	There are no stormwater network in close proximity to the reservoir. Open channel flow into the adjacent open field will suffice. Stormwater from roof to be at 1:100 slope, screeded.	Note	
4.3.5	Backfill against structure as far as possible. Steep slopes will make this difficult, to be reviewed at preliminary design	Note	
4.3.6	NM agreed to overburden on future cell location to facilitate settlement of fill material until construction of future cell.	Note	
4.3.7	Attenuation to be provided as required by environmental legislation. Siza Water does not have Specs for Attenuation at reservoirs	Note	
4.3.8	Future Fencing to match current - Concrete Palisades	Note	

<b>RECORD OF DISCUSSION</b>			
<b>ITEM</b>	<b>DETAILS</b>	<b>ACTION BY</b>	<b>DATE</b>
4.3.9	Siza Water in process of providing right of way servitude for access road to Tafeni Reservoir. Once concluded will send to SMEC for inclusion in reservoir design. Access road to be constructed after Reservoir Construction	Note	
4.3.10	Interconnection of cells to be facilitated with isolating valves for maintenance purposes.	Note	
4.3.11	Bottom outlet is acceptable, invert level to be confirmed from as-built drawings	Note	
4.3.12	A scoop overflow should be utilised. Discharge onto open V-drain (4.3.4). Overflow attenuation requirements to be confirmed	NM	
4.3.13	A freeboard of 500mm is sufficient for SSW	Note	
4.3.14	No store room required	Note	
4.3.15	Standard Sub-Soil drainage should suffice. TO be approved by SSW at preliminary design phase.	Note	
4.3.16	Standard SSW Telemetry to be installed.	Note	
<b>4.4</b>	<b>Information Required</b>		
4.4.1	Bosch was unable to provide the Geotechnical Report for the original Tafeni Reservoir to SMEC. NM to check project folder for Geotechnical Report and revert.	NM	Urgent
4.4.2	NM to forward Tafeni Reservoir As-Built Drawings to SMEC	NM	Urgent
4.4.3	NM to forward photos of recently constructed SSW reservoirs to SdP for examples	NM	
4.4.4	NM to forward SSW Telemetry standards to SdP	NM	
<b>4.5</b>	<b>Next Meeting</b>		
	As and when required	Note	

**MEETING TITLE: Bulk Water and Sewer Discussion No. 1**

**VENUE:** Siza Water

**START TIME:** 14h00

**MEETING DATE:** 18-07-2016

**FINISH TIME:** 15h15

**DISTRIBUTION:** All Attendees

**RECORDER:** ESAI **CHECKED BY:** RADESHNI

	NAME		ORGANISATION	NAME		ORGANISATION
<b>ATTENDEES</b>	Nikilesh Misra	NM	Sembcorp Siza Water	Terence o' Flaherty	TF	SMEC
	Martin Koekemoer	MK	SMEC	Gregg Cunningham	GC	SMEC
	Esaivani Naicker	EN	SMEC			
<b>APOLOGIES</b>	Radeshni Moodley	RM	SMEC			

#### RECORD OF DISCUSSION

ITEM	DETAILS	ACTION BY	DATE
<b>1.1</b>	<b>INTRODUCTION</b>		
1.1.1	GC welcomed all and explained that the purpose of the meeting is to discuss with Siza Water the Location of the Reservoir to supply Tinley Manor and for the location of the Sewer Pump stations and Gravity pipes.		
<b>1.2</b>	<b>WATER - BULK</b>		
1.2.1	GC: whether there was bulk planning for water and sewer previously agreed between Seaton Delaval and Siza Water.		
1.2.2	NM: Siza Water had meetings with Seaton Delaval and a plan was submitted for a proposed reservoir on the contour 105m.		
1.2.3	NM: The Bulk Supply out of Tafeni Reservoir varies between 1.0 – 1.5MG/Day. To ascertain the average daily supply we will have to check our records.		
1.2.4	NM: Existing Tafeni Reservoir site has the potential to be upgraded from the current 2.5MG to a possible 7.5MG in the form of 2 modules of 2.5MG each. The land transfer has been finalised but the engineering designs are still to be undertaken.		
1.2.5	GC: The water supply for Tinley Manor required is approx.. 6.13Ml/day Average Daily Flow for Reservoir Storage.		
1.2.6	NM: confirmed the peak factor of 3 should be applied		

<b>RECORD OF DISCUSSION</b>			
<b>ITEM</b>	<b>DETAILS</b>	<b>ACTION BY</b>	<b>DATE</b>
1.2.7	<p>MK: Siza Water can possibly consider acquiring Land adjacent to Taffeni Reservoir and increasing the ultimate size beyond the 7.5Megalitres(MI), (116m contour). This will assist Siza Water with limiting the number of Reservoir sites to perform maintenance. Tinley Manor can be catered off this as well as Seaton Delaval. GC can discuss with the THD with regards to land acquisition.</p> <p>NM confirmed that the land acquired for the existing reservoir was from Kwadukuza Municipality and it is possible that the land to the west of the reservoir also belonged to KDM. To have an upgraded reservoir to cater for Seaton Delaval, Tinley Manor and Natures Glen Developments at this position will assist Siza Water with maintenance and managing operations and this is a favourable option.</p>		
1.2.8	TF: at 116m, at a high level analysis, indications that for Tinley Manor, will require PRV's. Number required will be confirmed upon detail design.		
1.2.9	NM: Siza Water accepts the use of PRV's. Also was used in Zimbali.		
1.2.10	NM: NM advised that there is an existing 315mm diameter pipeline from Tafeni Reservoir which reduces to 200mm along Sheffield Drive. A proposed 200mm booster main was planned to feed from Tafeni Reservoir to the future Seaton Delaval Reservoir .	GC	
1.2.11	NM: Siza Water is currently investigating a recycling facility reverse osmosis and ultrafiltration plant at Sheffield wastewater treatment works(WWTW) similar to Frasers WWTW that augments potable water as back up for servicing future developments in the area.		
1.2.12	NM: From Frasers WWTW on average between 4 – 5 Megalitres-per-day(MI/day) of effluent is being treated. 3MI/Day is being planned to be utilised via the RO & UF Plant to supply potable water into the network. Currently at Sheffield less than 0.5MI/day is being treated and hence investigations around this is still required.	NM	
1.2.13	NM: the access to Taffeni Reservoir is not good. Possibility of THD providing an alternative access as part of upgrading Taffeni's to accommodate the development demands. GC to discuss with Client.		
<b>1.3</b>	<b>SEWER</b>		
1.3.1	MK: requires the location and invert level information of the terminal manhole to the Sheffield WWTW.	NM	

<b>RECORD OF DISCUSSION</b>			
<b>ITEM</b>	<b>DETAILS</b>	<b>ACTION BY</b>	<b>DATE</b>
1.3.2	<p>MK: informed that Servicing is challenging for a school proposed on the top site. proposed that we can gravitate across Palm Lakes(owned by Adrian Reynolds) to the low point across through a culvert to the Sheffield WWTW. Possibility of having above ground sewer due to tie in levels.</p> <p>NM: Sembcorp will consider the installation of above ground pipes as long as it complies with their requirements.</p>		
1.3.3	NM added that the Bulk Services Agreement to be finalised urgently and prior to any further discussions taking place.		
<b>1.4</b>	<b>CLOSURE</b>		
1.4.1	GC closed meeting at 15h15.		



**MEETING TITLE: Bulk Water and Sewer Discussion No. 2**

**VENUE:** Siza Water

**START TIME:** 15:00

**MEETING DATE:** 2016-09-05

**FINISH TIME:** 16:00

**DISTRIBUTION:** All Attendees

**RECORDER:**                      **CHECKED BY:**

	NAME		ORGANISATION	NAME		ORGANISATION
<b>ATTENDEES</b>	Nikilesh Misra	NM	Sembcorp Siza Water	Gregg Cunningham	GC	SMEC
	Radeshni Moodley	RM	SMEC	Siebren du Plessis	SdP	SMEC
<b>APOLOGIES</b>	Esaivani Naicker	EN	SMEC	Martin Koekemoer	MK	SMEC

#### RECORD OF DISCUSSION

ITEM	DETAILS	ACTION BY	DATE
<b>2.1</b>	<b>INTRODUCTION</b>		
	Tinley Manor South Banks EIA was rejected on the first submission. SMEC is responsible for the civil services of the development. This meeting is the 2nd between SMEC and Siza Water to discuss bulk services for the development	Note	
<b>2.2</b>	<b>BULK WATER</b>		
2.2.1	Tafeni Reservoir - Current Usage and SLA's		
	NM Informed the meeting that Siza Water has a number of SLA's in place for Tafeni Reservoir with other developers. NM to confirm spare capacity of Tafeni's Ultimate 7.5MI based on aforementioned SLA's. NEW SLA's only valid for 36 months. Extension on SLA's can be requested, but only be considered by Sembcorp Siza Water under special circumstances. Any unreasonable requests will be rejected	NM	
2.2.2	Tafeni Reservoir Expansion		
	SMEC and Siza currently investigating the possibility of expanding Tafeni Reservoir. The ultimate required size of the reservoir is estimated at 13MI, SMEC to confirm. THD to conduct TOPO survey of Tafeni Reservoir and adjacent property and propose new reservoir design for SLA purposes.	SMEC (GC/SdP)	
2.2.3	Tafeni Reservoir - Land Acquisition		
	In order to expand the Tafeni Reservoir, land needs to be acquired from KDM. EN to contact KDM to confirm property ownership.	EN	
2.2.4	TMSB Bulk Water Main Layout		
	Proposed Bulk Water main layout to run adjacent to P228. SMEC to confirm sizing.	EN	
2.2.5	Agreement for services in road reserve of P228		

<b>RECORD OF DISCUSSION</b>			
<b>ITEM</b>	<b>DETAILS</b>	<b>ACTION BY</b>	<b>DATE</b>
	Siza currently has services in P228 road reserve, but could not confirm process for wayleaves. NM will confirm whether he can find any records. EN to confirm ownership of P228 with KDM for wayleave process. Bosch installed existing services in P228 Road Reserve. Jason Holder can be contacted for more information	EN	
<b>2.3</b>	<b>BULK SEWER</b>		
2.3.1	Survey		
	Survey required of the Sheffield WWTW. NM to be contacted by surveyor to gain access.	SdP	
2.3.2	Proposed Sewer Layout		
	Original Sewer Design included 4 pump stations. New proposal includes only 2. NM indicated his acceptance of this. SMEC to indicate anticipated phasing and allow for sewer from Seaton Delaval to gravitate to southern pump station.	MK/RM	
<b>2.4</b>	<b>General</b>		
2.4.1	Siza Water still awaiting land transfer for Sheffield Manor WWTW. SdP to follow up with THD.	SdP	
2.4.2	Siza Water would be willing to follow same contribution agreement principles as used with Zimbali Lakes, if THD wishes	Note	
2.4.3	Registration of servitudes in Zimbali was discussed. SdP to follow up.	SdP	

## APPENDIX M – CORRESPONDENCE WITH KDM

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**MEETING TITLE:** Tinley Manor Road Discussions No. 1

**VENUE:** Kwadukuza Offices

**START TIME:** 11:30am

**MEETING DATE:** 31-Oct-16

**FINISH TIME:** 12:30am

**DISTRIBUTION:**

**RECORDER:** RM **CHECKED BY:**

	NAME		ORGANISATION	NAME		ORGANISATION
<b>ATTENDEES</b>	Du Plessis	S	SMEC	Mhlomgo	F	Kwadukuza LM(Civil)
	Moodley	R	SMEC	Pereina	C	Kwadukuza LM(Civil)
	Ntanta	M	Kwadukuza LM	Buthelezi	S	Kwadukuza LM(EDP)
<b>APOLOGIES</b>						

#### RECORD OF DISCUSSION

ITEM	DETAILS	ACTION BY	DATE
1.1	The North/South link road will ultimately be an extension of the current M4, running parallel and to the east of the N2 up until Zinkwazi	Note	
1.2	SMEC has been requested by KDM to include for this planning in the Tinley Manor South Banks Development	SMEC	
1.3	Initial Alignment is not ideal, due to the location of the Sheffield WWTW and proximity to the N2	Note	
1.4	Proposed North/South link road will most likely be a Class 3 Road	Note	
1.5	The proposed road should ideally not pass through the town centre	Note	
1.6	Provision for adequate servitude widths should be allowed for future expansion	Note	
1.7	KDM requested a low order link between Sheffield beach and Tinley Manor South Banks via the existing road.	SMEC/KDM	
1.8	This link will have EIA implications due to: a. Possible wetland crossing b. Increased traffic on existing Colwyn Road , might not be able to handle traffic.	SMEC/KDM	
1.9	KDM to send contact details for GIBB working on North South Link Road up to Salt Rock	KDM	
1.10	KDM is of the opinion that densification of the town layout is possible.	KDM	
1.11	Intersection/Interchange spacing's to conform to specified design standards	SMEC	