SECTION 5.4: DEMOGRAPHY

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AMENDMENT RECORD			
Rev	**Draft**	**Date**	**Description**
0		04 June 2015	New section, replacing KSSR Rev 0.
1		11 April 2022	Revised by SRK, accepted by Eskom.
1a		15 March 2024	Respond to comments received from the NNR. Includes updated information for informal settlements and spatial development frameworks.

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EXECUTIVE SUMMARY

This report is a partial update of the Duynefontyn Site Safety Report (DSSR) Section 5.4, Rev 1 (Eskom, 2022a).

This section of the DSSR presents the approach and results of the investigation and characterisation of the current and expected future demographic characteristics in the vicinity (i.e. 16 km radius) and region (i.e. 80 km radius) of the Duynefontyn site and those demographic aspects that affect or have importance for the feasibility of the emergency plans over the projected life of the nuclear installation(s).

The information contained within this section informs evaluations undertaken for the purposes of nuclear safety in ***Chapter 7*** (Potential Radiological Impact on the Public and Environment, PRIPE) and for the purposes of emergency planning in ***Chapter 8*** (Emergency Planning, EP).

Current national normative acts and regulations, specifically relevant to a demographic investigation, have been applied. Where there are no national requirements, criteria or limits, international standards and good practice were noted.

Information on existing and projected population distributions in the region, including resident populations and, to the extent possible, transient populations, were collected, analysed and presented. Special attention was paid to the population living in the immediate vicinity of the nuclear installation(s), to densely populated areas and population centres, and to special population groups and residential institutions such as homes for the aged, homes for the disabled, children's homes, prisons, hospitals, clinics, educational facilities, seasonal workers and informal settlements.

The results of the assessment have been presented in the form of figures, drawings and tables in this section of the DSSR and also in ***Appendices 5.4.A*** to ***5.4.P***. The results of the characterisation investigations are summarised below.

Current Permanent Population

- The analysis of the 2011 census data showed that a permanent population of approximately 4 351 410 persons resided within 80 km of the Duynefontyn site in 2011.

- The largest population concentrations in 2011 are in an east-southeast, southeast, south-southeast (highest) and south direction from the nuclear installation(s), coinciding with urban settlements within the City of Cape Town.

- Approximately 112 610 persons resided within the 16 km radius around the

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nuclear installation(s) in 2011.

- The population gender composition (2011) is relatively evenly distributed throughout the 16 km radius with females having a slightly higher count at approximately 57 670 females (51 per cent) against approximately 54 940 males (49 per cent).

- The majority of the permanent population (2011) within the 16 km radius (approximately 69 per cent) is under the age of 40 years and the largest age group (approximately 19 per cent) is comprised of people between the ages of 20 and 29 years.

- Approximately 32 260 dwellings are found within 16 km of the nuclear installation(s) (2011). The majority of the dwellings (approximately 92 per cent) are of a formal nature (such as houses, townhouses and flats) and approximately 8 per cent of the dwellings are of an informal nature (such as in backyards and informal settlements).

- The 2011 census data indicate that the site conforms to the international guidance provided by the United States Nuclear Regulatory Commission (US NRC) Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the Electric Power Research Institute (EPRI) Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) insofar as it relates to population density and centres for the 6.5 km radius. The site, however, does not conform to these guidelines in terms of its recommendations for the 16 km, 35 km and 50 km radii. Please note that the referenced documents act only as a guide and is not a National Nuclear Regulator (NNR) requirement.

The table below provides a summary of the main data presented above regarding permanent population as obtained from the latest census data (2011 census).

Summary of Permanent Population Characteristics (2011)

Characteristic	16 km Radius		80 km Radius
Population	112 610		4 351 410
Gender	Male	54 940 (49 per cent)	
	Female	57 670 (51 per cent)	
Age Group	Majority	< 40 years (69 per cent)	

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Characteristic	16 km Radius		80 km Radius
	Largest Group	20 to 29 years (19 per cent)	
Dwellings	Total	32 260	
	Formal	92 per cent	
	Informal	8 per cent	

At the time of writing the census 2022 small area data had yet to be released by STATSA. The report will undergo a complete update once the census 2022 data is available.

Special Population Groups

- Homes for the Aged

  Sixty homes for the aged, with cumulatively 5 277 residents, have been identified within 35 km of the nuclear installation(s).

  The home for the aged nearest to the nuclear installation(s) is Communicare: Kent Durr, which has 180 residents (2020) and is located at 22.8 km south-southeast.

  No homes for the aged are located in either the 0 km to 5 km EP zone or the 5 km to 16 km EP zone (2020).

- Homes for the Disabled

  Thirteen homes for the disabled, with cumulatively 550 residents, have been identified within 35 km of the nuclear installation(s).

  No homes for the disabled are located in the 0 km to 5 km EP zone (2020).

  Two homes for the disabled are located within the 5 km to 16 km EP zone. These homes are located at 13.7 km north-northeast (Orion) and 15.6 km northeast (Camphill Village). Orion has 60 residents and Camphill Village has 92 residents (2020).

- Children's Homes

  Twenty-one children's homes, with cumulatively 1 059 children, have been identified within 35 km of the nuclear installation(s).

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No children's homes are located in either the 0 km to 5 km EP zone or the 5 km to 16 km EP zone (2020).

The closest children's home is Durbanville Children's Home at 26.5 km southeast with 144 children (2020).

- Prisons

  One prison has been identified within 35 km of the nuclear installation(s).

  The Goodwood Correctional Centre, located at 25.4 km south-southeast, has a capacity of 2 115 prisoners (actual number was 2 438 prisoners in 2020).

- Hospitals and Clinics

  Forty-seven hospitals, with cumulatively 11 695 beds, have been identified within 80 km of the nuclear installation(s).

  No hospitals are located in the 0 km to 5 km EP zone (2020).

  Two hospitals are located within the 5 km to 16 km EP zone. These are the Wesfleur Hospital in Atlantis (13.8 km north-northeast) with 50 beds and the Blaauwberg Netcare (14.9 km south-southeast) with 180 beds.

  There are 45 hospitals located in the 16 km to 80 km EP zone. These have a combined number of 11 465 beds.

  Thirty-six clinics have been identified within 35 km of the nuclear installation(s).

  The closest clinic from the nuclear installation(s) is the Seapark Clinic located at 4.5 km south-southeast.

  Two clinics are located in the 0 km to 5 km EP zone, but no clinics are located in the 5 km to 16 km EP zone (2020).

- Education Facilities

  o Universities

    Four universities, with cumulatively 117 018 students, have been identified within 80 km of the nuclear installation(s).

    No universities are located in either the 0 km to 5 km EP zone or the 5 km to 16 km EP zone (2018).

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All four universities are in the 16 km to 80 km EP zone. These are the Cape Peninsula University of Technology with approximately 34 220 students located at 28.1 km south, the University of Cape Town with approximately 28 700 students located at 31.3 km south, the University of the Western Cape with approximately 22 840 students located at 33.8 km south-southeast and the University of Stellenbosch with approximately 31 260 students located at 49.1 km southeast.

- Schools

  One thousand one hundred and forty-two schools, with cumulatively 857 208 students, have been identified within 80 km of the nuclear installation(s).

  There is one school (2018) within the 0 km to 5 km EP zone. This is the Van Riebeeckstrand Primary School at 3.4 km south-southeast with 1 123 learners.

  There are a total of 30 schools located within the 5 km to 16 km EP zone. These 30 schools have a combined total of approximately 22 930 learners (2018).

  There are a total of 1 111 schools located within the 16 km to 80 km EP zone. These 1 111 schools had a combined total of approximately 833 150 learners (2018).

- Day-care Centres/Early Childhood Development Centres

  One-hundred and two day-care centres, with cumulatively 5 668 children, have been identified within 35 km of the nuclear installation(s).

  There is one day-care centre located in the 0 km to 5 km EP zone (2018). This is the Babbel en Krabbel day-care centre at 4.8 km south-southeast with 57 children.

  There are 5 day-care centres located in the 5 km to 16 km EP zone with a combined total of 247 children.

- Informal Settlements

  Forty-four informal settlements, with cumulatively 27 441 informal dwellings in 2023, have been identified within 35 km of the nuclear installation(s).

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The data indicate that one informal settlement is located in the 0 km to 5 km EP zone. This is the Kleinzouterivier settlement at 3.0 km south-southeast, with approximately 25 informal dwellings.

The data indicate that there are 16 informal settlements located in the 5 km to 16 km EP zone. These 16 informal settlements have a combined total of approximately 4 996 informal dwellings.

Informal settlements continue to spring up across the City of Cape Town as a result of rapid urbanisation and population growth. In an attempt to combat unlawful occupation of land, the City of Cape Town approved the Unlawful Occupation By-Law, 2021. This By-Law sets out procedures and obligations for both the City of Cape Town and private landowners with regard to land that is unlawfully occupied. It is the responsibility of all landowners to monitor unlawful occupation of land, as well as for actioning the necessary measures to remove unlawful occupants in a timeous manner.

The table below provides a summary of the main data presented above regarding special population groups.

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Summary of Special Population Groups in PAZ, UPZ, 35 km Radius and 80 km Radius

Special Population Group		Number of Facilities, Residents, Children, Prisoners, Beds, Students, Informal Settlements and Informal Dwellings per specified Annulus or Radius				Nearest Facility
		PAZ[1] (0 - 5 km)	UPZ[2] (5 - 16 km)	35 km Radius	80 km Radius	
Homes for the Aged (2020)	Facilities	0	0	60	-	Communicare: Kent Durr, 180 residents, 22.8 km south-southeast
	Residents	0	0	5 277	-	
Homes for the Disabled (2020)	Facilities	0	2	13	-	Orion, 60 residents, 13.7 km north-northeast
	Residents	0	152	550	-	
Children's Homes (2020)	Facilities	0	0	21	-	Durbanville Children's Home, 144 children, 26.5 km southeast
	Children	0	0	1 059	-	
Prisons (2020)	Facilities	0	0	1	-	Goodwood Correctional Centre, 2 438 prisoners, 25.4 km south-southeast
	Prisoners	0	0	2 438	-	
Clinics (2020)	Facilities	2	0	36	-	Seapark Clinic, 4.5 km south-southeast
Hospitals (2020)	Facilities	0	2	26	47	Wesfleur Hospital, 50 beds, 13.8 km north-northeast
	Beds	0	230	7 788	11 695	
Universities (2018)	Facilities	0	0	3	4	Cape Peninsula University of Technology, 34 220 students, 28.1 km south
	Students	0	0	85 760	117 018	
Schools (2018)	Facilities	1	30	252	1 142	Van Riebeeckstrand Primary School, 1 123 children, 3.4 km south-southeast
	Children	1 123	22 930	176 179	857 208	
Day-care Centres (2018)	Facilities	1	5	102	-	Babbel en Krabbel, 57 children, 4.8 km south-southeast
	Children	57	247	5 668	-	
Informal Settlements (2023)	Settlements	1	16	44	-	Kleinzouterivier, 25 structures, 3.0 km south-southeast
	Dwellings	25	4 996	27 441	-	

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Temporary Population

- Five residential resorts, and their occupancy periods and occupation rates, have been identified within 35 km of the nuclear installation(s).
- Fifteen main recreational venues, and their capacity and maximum persons/day or average persons/day or average persons/event, have been identified within 35 km of the nuclear installation(s).
- Six main annual sport and concert events, and their number of participants or concertgoers on a specific day, have been identified within 35 km of the nuclear installation(s).
- The activities and number of beachgoers per beach or stretch of coastline have been identified within 35 km of the nuclear installation(s).
- Twenty-nine main shopping centres, and their latest available foot counts, have been identified within 35 km of the nuclear installation(s).
- Fifteen main conference facilities, and their capacities, have been identified within 35 km of the nuclear installation(s).
- The tourist population distribution has been projected in five-year intervals up to 80 km from the nuclear installation(s) until 2096. The total number of tourists within the 80 km radius around the Duynefontyn site on any one day in the peak month (i.e. December) has been estimated (upper estimate) to be approximately:
    - 191 750 tourists in 2018;
    - 228 040 tourists in 2026;
    - 322 150 tourists in 2046;
    - 805 600 tourists by 2096.

[1] Precautionary Action Zone (PAZ): where the risk of deterministic effects is sufficiently high to warrant pre-emptive protective actions based on plant conditions, before or shortly after any release of radioactivity to the environment (National Nuclear Regulator, 2012).

[2] Urgent Protective Action Planning Zone (UPZ): where the risk of stochastic effects is sufficiently high to warrant plans to implement protective actions based on environmental monitoring or plant conditions (National Nuclear Regulator, 2012).

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Projected Population

- Various factors influence population data and growth within a particular geographical region. Such factors include, *inter alia*, fertility rates, birth rates, infection rates of HIV/AIDS and tuberculosis, death rates, migration, government policies and spending (e.g. economic policies, spatial policies such as the identification of new development nodes). These factors fluctuate over time and cannot be reliably foreseen over long periods. Consequently, the reliability of population projections and its distribution decrease over time.

- Population projections for the permanent population have been presented based on existing reputable growth rates that have been estimated for the area, spatial planning directives and known growth rates (e.g. comparing current census data with previous census data for the area, estimated growth rates as obtained from local authorities and allocation of population numbers to sectors envisaged for future growth and development).

- The 2001 and 2011 census data indicate that the Blaauwberg District, within which the nuclear installation(s) is located, experienced substantial population growth between 2001 and 2011 (i.e. 6 per cent). The Blaauwberg District had the highest population growth rate within the City of Cape Town during this period.

- The permanent population distribution has been projected in five-year intervals up to 80 km from the nuclear installation(s) until 2096. The permanent population projections within the 80 km radius around the nuclear installation(s) indicate approximately:

  - 5 128 040 persons in 2018;
  - 6 134 620 persons in 2026;
  - 8 682 380 persons in 2046;
  - 21 594 510 persons by 2096.

- The permanent population projections indicate that the site conforms to the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) insofar as it relates to population density and centres in respect of the 6.5 km radius in 2018 and 2026. However, based on current growth trends, the site may possibly not conform to these guidelines for the 6.5 km radius in 2046 and 2096

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and the 16 km, 35 km and 50 km radii for 2018, 2026, 2046 and 2096. Please note that the referenced documents act only as a guide and is not a NNR requirement.

- A number of measures have been incorporated into the City of Cape Town Municipal Spatial Development Framework (2023), the Blaauwberg District Spatial Development Framework (2023) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

Total Cumulative Population

- The total cumulative population (i.e. the tourist population on any one day in the peak tourist month added to the permanent population) has been projected in five-year intervals up to 80 km from the nuclear installation(s) until 2096. The total cumulative population projections within the 80 km radius around the nuclear installation(s) indicate approximately:

  - 5 319 790 persons in 2018;
  - 6 362 660 persons in 2026;
  - 9 004 530 persons in 2046;
  - 22 400 120 persons by 2096.

- The total cumulative population estimates indicate that the site conforms to the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) insofar as it relates to total cumulative population density and centres in respect of the 6.5 km radius in 2018 and 2026. However, based on current growth trends, the site may possibly not conform to these guidelines for the 6.5 km radius in 2046 and 2096 and the 16 km, 35 km and 50 km radii for 2018, 2026, 2046 and 2096. Please note that the referenced documents act only as a guide and is not a NNR requirement.

- A number of measures have been incorporated into the City of Cape Town Municipal Spatial Development Framework (2023), the Blaauwberg District Spatial Development Framework (2023) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

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Main Regional Activities

- The current regional activities are presented in ***Sections 5.5*** (Land and Water Use), ***5.6*** (Adjacent Sea Use) and ***5.7*** (Nearby Transportation, Industrial and Military Facilities).

- Several statutes influence the use of land in the Western Cape Province.

  The Local Government: Municipal Systems Act, 2000 provides for *inter alia* forward planning documentation such as structure plans and spatial development frameworks (SDFs) to be adopted in terms of municipal integrated development plans.

  The Western Cape Land Use Planning Act, 2014 has replaced the previous Land Use Planning Ordinance, 1985. The land use planning principles contained in the Western Cape Land Use Planning Act apply to all organs of state responsible for the implementation of legislation regulating the utilisation and development of land.

  Local authorities have, based on the prescriptions and guidance provided in the Local Government: Municipal Systems Act and Western Cape Land Use Planning Act, drafted and adopted municipal planning by-laws for their respective areas of jurisdiction. The purpose of the municipal planning by-laws is to regulate and control municipal planning matters within the geographical areas of the local authorities. This includes *inter alia*:

  - spatial planning (i.e. SDFs);
  - development management (i.e. zoning schemes / development management schemes);
  - application requirements;
  - application procedures;
  - decision making;
  - enforcement.

- The projected regional activities (which influence population distribution) around the nuclear installation(s) are to a large extent determined by the control of land use and spatial planning. Future activities are therefore presented by discussing

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the strategic spatial planning strategies and policies.

- The City of Cape Town Municipal Spatial Development Framework (2023) and the Blaauwberg District Spatial Development Framework (2023) are the most recent applicable spatial planning frameworks relevant to the area surrounding the site.

- The City of Cape Town Development Management Scheme (DMS) is included within the City of Cape Town Municipal Planning By-Law, 2015. The DMS includes the Koeberg Restriction Area Overlay Zoning that provides for specific development management measures within the PAZ and UPZ.

- Development in the vicinity of the nuclear installation(s) must be monitored and controlled, with special mention of the PAZ and UPZ. This is to ensure that no change of land use occurs within the vicinity of the nuclear installation(s) which may give rise to population numbers or activities that may have a detrimental impact on emergency planning. These requirements need to be retained within existing strategic planning directives, SDFs and by-laws and incorporated within future strategic planning directives, SDFs and by-laws where applicable.

Habits Survey

- A Habits Survey was conducted in 2023/24 for the purposes of updating the

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DSSR. The results are reported in ***Chapter 7*** of the SSR.

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Demography in Emergency Planning Zones

- 0 km to 5 km EP zone (PAZ):
  - It was estimated that the PAZ had a permanent population (2018) of approximately 6 720 persons.
  - The estimated total cumulative population (2018) within the PAZ was approximately 7 010 persons.
  - A permanent population of approximately 8 830 persons has been projected for the PAZ by 2026.
  - A total cumulative population of approximately 9 200 persons has been projected for the PAZ by 2026.
  - A permanent population of approximately 12 970 persons has been projected for the PAZ by 2046.
  - A total cumulative population of approximately 13 520 persons has been projected for the PAZ by 2046.
  - A permanent population of approximately 34 900 persons is projected for the PAZ by 2096.
  - A total cumulative population of approximately 36 380 persons is projected for the PAZ by 2096.
  - Of the approximately 3 610 persons residing in the PAZ in 2011, 1 850 persons (51 per cent) are female and 1 757 persons (49 per cent) are male.
- 5 km to 16 km EP zone (UPZ):
  - It was estimated that the UPZ had a permanent population (2018) of approximately 136 660 persons.
  - The estimated total cumulative population (2018) within the UPZ was approximately 142 470 persons.

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- A permanent population of approximately 175 650 persons has been projected for the UPZ by 2026.
- A total cumulative population of approximately 183 120 persons has been projected for the UPZ by 2026.
- A permanent population of approximately 272 740 persons has been projected for the UPZ by 2046.
- A total cumulative population of approximately 284 330 persons has been projected for the UPZ by 2046.
- A permanent population of approximately 742 850 persons is projected for the UPZ by 2096.
- A total cumulative population of approximately 774 440 persons is projected for the UPZ by 2096.
- Of the approximately 109 000 persons residing in the UPZ in 2011, 55 820 persons (51 per cent) are female and 53 180 persons (49 per cent) are male.

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- 16 km to 80 km EP zone (LPZ[3]):
  - It was estimated that the LPZ had a permanent population (2018) of approximately 4 984 660 persons.
  - The estimated total cumulative population (2018) within the LPZ was approximately 5 170 310 persons.
  - A permanent population of approximately 5 950 140 persons has been projected for the LPZ by 2026.
  - A total cumulative population of approximately 6 170 340 persons has been projected for the LPZ by 2026.
  - A permanent population of approximately 8 396 670 persons has been projected for the LPZ by 2046.
  - A total cumulative population of approximately 8 706 680 persons has been projected for the LPZ by 2046.
  - A permanent population of approximately 20 816 760 persons is projected for the LPZ by 2096.

A total cumulative population of approximately 21 589 300 persons is projected for the LPZ by 2096.

The table below provides a summary of the main data presented above regarding the population in emergency planning zones.

Summary of Population in Emergency Planning Zones and Total Population in the Region (2018, 2026, 2046 and 2096)

Year	Population per Emergency Planning Zone			
	PAZ (0 - 5 km)	UPZ (5 - 16 km)	LPZ (16 - 80 km)	80 km Radius (0 - 80 km)
Permanent Population				
2018	6 720	136 660	4 984 660	5 128 040

[3] A Long Term Protective Action Planning Zone (LPZ), where preparations for effective implementation of protective actions to reduce the risk of stochastic health effects from long term exposure to deposition and ingestion must be developed in advance consistent with international standards (Department of Energy, 2011).

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Year	Population per Emergency Planning Zone			
	PAZ (0 - 5 km)	UPZ (5 - 16 km)	LPZ (16 - 80 km)	80 km Radius (0 - 80 km)
2026	8 830	175 650	5 950 140	6 134 620
2046	12 970	272 740	8 396 670	8 682 380
2096	34 900	742 850	20 816 760	21 594 510
Total Cumulative Population				
2018	7 010	142 470	5 170 310	5 319 790
2026	9 200	183 120	6 170 340	6 362 660
2046	13 520	284 330	8 706 680	9 004 530
2096	36 380	774 440	21 589 300	22 400 120

Uncertainties

A number of uncertainties have been identified, including issues relating to the following:

- population projections;
- tourist data and projections;
- transient nodes and recreational destinations;
- projected special population groups;
- spatial planning.

Monitoring

Proposed monitoring measures to reduce the abovementioned uncertainties include the following:

- Pre-operational:
  - o Population Projections: It is essential to update or confirm population distribution data and projected population figures on a regular basis, e.g. shortly after the completion of national censuses.
  - o Tourist Data and Projections: Tourist population numbers and projections

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should periodically be reviewed and updated throughout the nuclear installation lifetime. This should be carried out at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- o Transient Nodes and Recreational Destinations: The number, location and capacity of existing and future transient nodes and recreational destinations and venues should be periodically reviewed and updated. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- o Special Population Groups: The number and location of existing and future special population groups should periodically be reviewed and updated. This should be carried out at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- o Spatial Planning: It is essential to ensure that the requirements and needs of the nuclear installation(s) are considered and accounted for by local authorities in strategic planning directives, SDFs and applicable by-laws when these are periodically updated or amended.

- o Projected populations within the PAZ and UPZ must be monitored and controlled to ensure change of land use within the site vicinity is evaluated for its potential impact on emergency planning.

- Operational:

  - o Population Projections: It is essential to update or confirm population distribution estimates and projected population data throughout the nuclear installation lifetime on a regular basis, e.g. shortly after the completion of national censuses.

  - o Tourist Data and Projections: Tourist population numbers and projections should periodically be reviewed and updated throughout the nuclear installation lifetime. This should be carried out at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

  - o Transient Nodes and Recreational Destinations: The number, location and capacity of existing and future transient nodes and recreational destinations and venues should be periodically reviewed and updated throughout the

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nuclear installation lifetime. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- o Special Population Groups: The development of existing and future special population groups in terms of their number and location should periodically be reviewed and updated throughout the nuclear installation lifetime. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- o Spatial Planning: It is essential to ensure that the requirements and needs of the nuclear installation(s) are considered and taken into account by local authorities in strategic planning directives, SDFs and applicable by-laws when these are periodically updated and amended.

- o Projected populations within the PAZ and UPZ must be monitored and controlled to ensure change of land use within the site vicinity is evaluated for its potential impact on emergency planning.

- Post Operational:

  The same demographic data as for the operational stage of the nuclear installation(s) should be monitored within 16 km of the site. The scope and focus of the monitoring will depend on the level of contamination of the site and the end state of decommissioning, e.g. restricted use (e.g. temporary storage of waste) or unrestricted release from regulatory control (e.g. use for farming or residential area). These and other considerations should be considered by the local planning authority in strategic planning directives, SDFs and applicable by-laws.

Conclusion

In conclusion, the following can be confirmed:

- The population characteristics in the site region and site vicinity have been determined.

- The current and future population distribution and densities in the site region and site vicinity have been determined.

- Studies have been conducted to an adequate level of detail for the purpose of PRIPE (***Chapter 7***) and EP (***Chapter 8***).

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- The demography information presented in this section may also be utilised in the Probabilistic Safety Assessment (PSA) Level 3.
- Appropriate monitoring programmes to provide ongoing assurance regarding the viability of the site over its lifecycle can be established.
- This section of this DSSR complies with relevant regulatory requirements.

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5.4 DEMOGRAPHY

5.4.1 Introduction

This section of the Duynefontyn Site Safety Report (DSSR) presents the approach and results of the investigation and characterisation of the current and expected future demographic characteristics in the vicinity and region of the Duynefontyn site (hereinafter referred to as 'the site') and those demographic aspects that affect or have importance for the feasibility of the emergency plans over the projected life of the nuclear installation(s).

This report is a partial update of the DSSR Section 5.4, Rev 1 (Eskom, 2022a)

5.4.2 Purpose and Scope

The purpose of the population description is to support the demonstration of the suitability of the site for the development of an additional nuclear installation(s) as well as to support the Koeberg Nuclear Power Station's (KNPS) ongoing operational requirements.

The current and future population data were characterised in order to assess the potential effects of the nuclear installation(s) on the public in the vicinity and region of the site (to be presented in ***Chapter 7***, Potential Radiological Impact on the Public and Environment, PRIPE) and to demonstrate the feasibility of implementing the emergency plans over the projected lifetime of the nuclear installation(s) (to be presented in ***Chapter 8***, Emergency Planning, EP). More specifically, the population distribution and population density around the site and other demographic characteristics are presented in order to assist in (Eskom, 2014) (Eskom, 2022b):

- evaluation of the potential radiological impacts of normal radioactive discharges and accidental releases (to be presented in ***Chapter 7*** of the DSSR);
- demonstration of the feasibility of implementing the emergency response plans associated with the respective emergency zones (to be presented in ***Chapter 8*** of the DSSR);
- Probabilistic Safety Assessment (PSA) Level 3;

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- assurance that existing and planned local and regional developments do not compromise the viability of the site over its lifecycle;

- implementation of appropriate monitoring programmes to provide ongoing assurance that the viability of the site will not be compromised by possible formal and informal settlement development.

5.4.3 Regulatory Framework

5.4.3.1 Legal Requirements

The legal and regulatory basis that guide the compilation of this DSSR is outlined in ***Chapter 2*** (Legal and Regulatory Basis). The current national regulations specifically relevant to a demographic investigation for site licensing to be taken into account are The Regulations on Licensing of Sites for New Nuclear Installations (Department of Energy, 2011). These require that the DSSR contains:

"*5. A Site Safety Report referred to in Regulation 3(2)(a) must contain the following –*

(3) The characteristics of the site relevant to the design assessment, risk and dose calculations, including inter alia:

(d) population demographics;

(f) projections of the above data commensurate with the design life of the nuclear installation(s)."

5.4.3.2 Guideline Documents

Although not legal requirements, national and international standards and recommendations have also been considered as guideline documents in order to indicate that the characterisation of the site demography is performed and presented in line with best practice. In this regard, the following should be noted:

- National Nuclear Regulator, Regulatory Guide RG-0011, Interim Guidance for the Siting of Nuclear Facilities, Rev.0 (National Nuclear Regulator, 2016). This requires:

  - Section 6.1(c), *"Population density and distribution…"*

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- Section 8.5.1, *"The region of interest (henceforth referred to as the region) should include an area immediately surrounding the site of a nuclear facility. It should also include the overall Emergency Planning Zone (EPZ), where applicable, in which population distribution, population density, population growth rate… are considered in relation to the feasibility of implementing emergency measures."*

- Section 8.5.2, *"The distribution of the population within the region should be determined within 16 sectors of 22.5° each."*

- Section 8.5.3, *"The most recent census data for the region, or the extrapolation of the data, should be used in obtaining the population distribution."*

- Section 8.5.4, *"In the absence of reliable data, a special study should be carried out to determine the population in the region."*

- Section 8.5.7, *"The size of population centres within the low population zone should be limited, in total number and density, so that there is a reasonable probability that appropriate protective measures could be taken in the event of a serious accident."*

- Section 8.5.8, *"Projected changes in the population should cover the life of the plant and take into account already approved developments and regional plans. Otherwise liaison must take place to have the regional plans changed accordingly."*

- Section 8.5.9, *"Data on the present population in the region should be obtained from local authorities or by means of special field surveys and these data should be as accurate and as up to date as possible. The term 'present population' includes the two categories of permanent population and temporary population."*

- Section 8.5.11, "*The information of the temporary population should cover:*

  (a) The short-term transient population, such as tourists and nomads; and

  (b) The long-term transient population, such as seasonal inhabitants and students."

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- Section 8.5.12, *"The maximum size of the temporary population and its periods of occupancy in the low population zone should be estimated. Particular types of institutions such as schools, hospitals, prisons… within the zone should be identified for the purposes of emergency planning. In the area outside the zone, estimates of the approximate size of the temporary population together with its periods of occupancy should be made."*

- Section 8.5.13, *"A projection of the present population in the region should be made for:*

  (a) The expected year of commissioning of the plant; and

  (b) Selected years (e.g. every tenth year) over the lifetime of the plant."

- Section 8.5.14, *"Projections should be made on the basis of population growth rate, migration trends and plans for possible development in the region. The projected figures for permanent population and temporary population should be extrapolated separately if data are available."*

- Section 8.5 15, *"Data should be analysed to give both the current and the projected population distribution in terms of direction and distance from the plant."*

- Section 8.5.17, *"The population data collected should be presented in a suitable format and scale to permit correlation with other relevant data, such as data on atmospheric dispersion and on uses of land and water. Additional details should be given for areas closer to the site, especially within the low population zone."*

- International Atomic Energy Agency (IAEA) Safety Standards No. SSR-1, Site Evaluation for Nuclear Installations (International Atomic Energy Agency, 2019) establishes requirements for:

  - Paragraph 1.4(c), *"Analysing the characteristics of the population… to determine whether there would be significant difficulties in implementing emergency response actions effectively [9]."*

  and requires inter alia the following aspects to be addressed:

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- Paragraph 4.6(c), *"The population density, population distribution... in the external zone…"*
- Paragraph 4.15, "*The site and the region shall be studied to evaluate the present and foreseeable future characteristics that could have an impact on the safety of the nuclear installation. This includes…, as well as changes in the population distribution in the region… that could affect the safety of the nuclear installation or the feasibility of planning effective emergency response actions."*
- Requirement 26: *Population distribution and public exposure, "The existing and projected population distribution within the region over the lifetime of the nuclear installation shall be determined…"* This requires, inter alia:
  - Paragraph 6.8*, "Information on the existing and projected population distribution in the region, including resident populations and (to the extent possible) transient populations, shall be collected and kept up to date over the lifetime of the nuclear installation. Special attention shall be paid to vulnerable populations and residential institutions (e.g. schools, hospitals, nursing homes and prisons) when evaluating the potential impact of radioactive releases and considering the feasibility of implementing protective actions."*
  - Paragraph 6.9, *"The most recent census data for the region, or information obtained by extrapolation of the most recent data on resident populations and transient populations, shall be used in obtaining the population distribution. In the absence of reliable data, a special study shall be carried out."*
  - Paragraph 6.10, *"The data shall be analysed to obtain the population distribution in terms of the direction and distance from the site..."*

- IAEA Safety Guide No. NS-G-3.2, Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for Nuclear Power Plants (International Atomic Energy Agency, 2002). This requires:
  - Paragraph 5.1, *"The distribution and characteristics of the*

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regional population should be studied in the site evaluation for a nuclear power plant."

- Paragraph 5.4, *"The term 'present population' includes the two categories of permanent population and temporary population. Data on the present population in the external zone[4] should be obtained from local authorities or by means of special field surveys, and these data should be as accurate and up to date as possible. Similar data should also be collected throughout the region outside the external zone to distances determined in accordance with national practice and regulatory objectives. The data should include the number of people normally present in the area, and the locations of houses, hospitals, prisons and other institutions and recreational facilities such as parks and marinas."*

- Paragraph 5.6, *"The information on the temporary population should cover:*

  - *the short term transient population, such as tourists and nomads; and*

  - *the long term transient population, such as seasonal inhabitants and students."*

- Paragraph 5.7, *"The maximum size of the temporary population and its periods of occupancy in the external zone should be estimated. Particular types of institutions such as schools, hospitals, prisons… within the external zone should be identified for the purposes of emergency planning. In the area outside the external zone, estimates of the approximate size of the temporary population together with its periods of occupancy should be made."*

- Paragraph 5.8, *"A projection of the present population in the region should be made for:*

  - *the expected year of commissioning of the plant;*

  - *selected years (e.g. every tenth year) over the lifetime of the*

[4] The area immediately surrounding a proposed site area in which population distribution and density, and land and water uses, are considered with respect to their impact on planning effective emergency response actions (International Atomic Energy Agency, 2022).

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plant."

- Paragraph 5.9, *"Projections should be made on the basis of population growth rate, migration trends and plans for possible development in the region. The projected figures for the two categories of permanent population and temporary population should be extrapolated separately if data are available."*
- Paragraph 5.10, *"Data should be analysed to give both the current and the projected population distribution in terms of direction and distance from the plant."*
- Paragraph 5.12, *"The population data collected should be presented in a suitable format and scale to permit their correlation with other relevant data, such as data on atmospheric dispersion and on uses of land and water. The two categories of permanent population and temporary population should be clearly indicated. In general, population data should be presented either in tabular form, or graphically, using concentric circles and radial segments with the site as the origin. More details should be given for areas closer to the site, especially within the external zone."*

- United States Nuclear Regulatory Commission (US NRC) Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014). This requires:
  - Section C.5, *"A reactor should be located so that, at the time of initial plant approval within about 5 years thereafter, the population density, including weighted transient population, averaged over any radial distance out to 20 mi (cumulative population at a distance divided by the circular area at that distance), does not exceed 500 persons per square mile. A reactor should not be located at a site where the population density is well in excess of this value."*
  - Section C.5, *"The transient population should be included for those sites where many people (other than those just passing through the area) work, reside part time, or engage in recreational activities but are not permanent residents of the area. The transient population should be considered for site evaluation purposes by weighting the transient population according to the fraction of time that the transients are in the*

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area."

- Section C.5, *"Population projections should be considered over the lifetime of the facility… Further population projections should be made by decade for a 40-year period beyond the start of power plant operation…"*
- Section C.6, *"Special population groups, such as those in hospitals, prisons, schools, or other facilities, that could have special needs during an emergency should be identified."*

- US NRC NUREG-0800, Standard Review Plan, Section 2.1.3 Population Distribution (U.S. Nuclear Regulatory Commission, 2007). This requires:
  - *"…the staff will review data about the population in the site vicinity, including transient populations. The population information reviewed includes data from the latest census, and the projected population at the year of plant approval and 5 years thereafter."*
  - *"The staff will review information about the population in the exclusion area. Although the exclusion area should not contain any residents, if such residents do exist, they should be subject to ready removal, if necessary."*

- US NRC Title 10 of the Code of Federal Regulations, Part 100, Reactor Site Criteria (U.S. Nuclear Regulatory Commission, 2016). This requires:
  - Section 100.20(a), *"Population density and use characteristics of the site environs, including the exclusion area, the population distribution, and site-related characteristics must be evaluated..."*
  - Section 100.21(a*), "Every site must have an exclusion area and a low population zone…"*
  - Section 100.21(h), *"Reactor sites should be located away from very densely populated centres. Areas of low population density are, generally, preferred..."*

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- US NRC Regulatory Guide 1.70, Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition) (U.S. Nuclear Regulatory Commission, 1978). This requires:

  - Section 2.1.3.1, Population within 10 miles, the population distribution should be presented *"On a map of suitable scale that identifies places of significant population grouping such as cities and towns within a 10-mile radius, concentric circles should be drawn, with the reactor at the centre point, at distances of 1, 2, 3, 4, 5, and 10 miles. The circles should be divided into 22-½-degree segments with each segment centred on one of the 16 compass points (e.g. true north, north-northeast, northeast). A table appropriately keyed to the map should provide the current residential population within each area of the map formed by the concentric circles and radial lines. The same table, or separate table, should be used to provide the projected population within each area for (1) the expected first year of plant operation and (2) by census decade (e.g. 1990) through the projected plant life. The tables should provide population totals for each segment and annular ring, and a total for the 0 to 10 miles enclosed population. The basis for population projections should be described."*

  - Section 2.1.3.2, Population between 10 and 50 miles, *"A map of suitable scale and appropriately keyed tables should be used in the same manner as described above to describe the population and its distribution at 10-mile intervals between the 10- and 50-mile radii from the reactor."*

- Electric Power Research Institute (EPRI) Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015). This requires:

  - Section 3.1.2.1, *"...a population centre of about 25,000 or more residents should be no closer than 4 miles (6.4 km) from the reactor because a density of 500 persons per square mile (ppm) (500 persons per 2.6 km²) within this distance would yield a population of 25,000 persons. Similarly, a city of 100,000 or more should be no closer than about 10 miles (16.1 km²); a city of 500,000 or more should be no closer than about 20 miles (32.2 km); and a city of 1,000,000 or more should be no closer than about 30 miles (48.3 km)."*

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- Section 3.1.2.1, *"The transient population should be included in the population figures for those sites where a significant number of people (other than those just passing through) work, reside part-time, or engage in recreational activities and are not permanent residents of the area."*
- Section 3.1.2.2, *"Special population groups (such as those in hospitals, correctional institutions, or other facilities with special emergency situation needs) should also be taken into account."*

- IAEA Safety Glossary, Terminology Used in Nuclear Safety and Radiation Protection (International Atomic Energy Agency, 2022).

  Note that where differences occur in the definitions of terminology of the NNR and the IAEA, the NNR definitions shall take precedence.

5.4.4 Approach to the Evaluation

On the basis of the regulatory requirements and supporting guidance presented above, as well as the Technical Specification for Site Safety Reports: Demography (Eskom, 2014) (Eskom, 2022b), the characterisation of the demography has been performed and presented in this section of the DSSR with a view to:

- determine the population characteristics in the site region and site vicinity;
- determine the current and future population distribution and densities in the site region and site vicinity;
- identify the important demographic parameters such as age and gender;
- provide input for evaluation of the potential radiological impacts of normal radioactive discharges and accidental releases (to be presented in ***Chapter 7*** of the DSSR);
- provide input for evaluation of the feasibility of the emergency plan (to be presented in ***Chapter 8*** of the DSSR);
- assist in Probabilistic Safety Assessment (PSA) Level 3;
- identify areas of uncertainties;

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- identify critical / important features and characteristics as well as required future actions (e.g. additional monitoring and confirmatory studies).

As per the Technical Specification for Site Safety Reports: Demography (Eskom, 2014) (Eskom, 2022b) the following two main population groups have been analysed:

- permanent population;
- temporary population.

The main demographic characteristics presented and evaluated include:

- population distribution;
- population centres and density;
- transient population;
- special population groups;
- projected population;
- cumulative population.

A description of the above characteristics has been provided, supported by tables, figures and drawings to illustrate the results and conclusions. The description focuses on population densities relative to distance and direction from the nuclear installation(s).

5.4.4.1 Area of Investigation

The description and characterisation of the population distribution has been conducted for an area that complies with NNR requirements for siting (Department of Energy, 2011), the position paper on emergency planning (EP) zones for new nuclear installations (Eskom, 2009) and the Technical Specification for Site Safety Reports: Demography (Eskom, 2014) (Eskom, 2022b).

In summary the following areas have been investigated:

- the site region – within an 80 km radius (***Drawing 5.4.1***);

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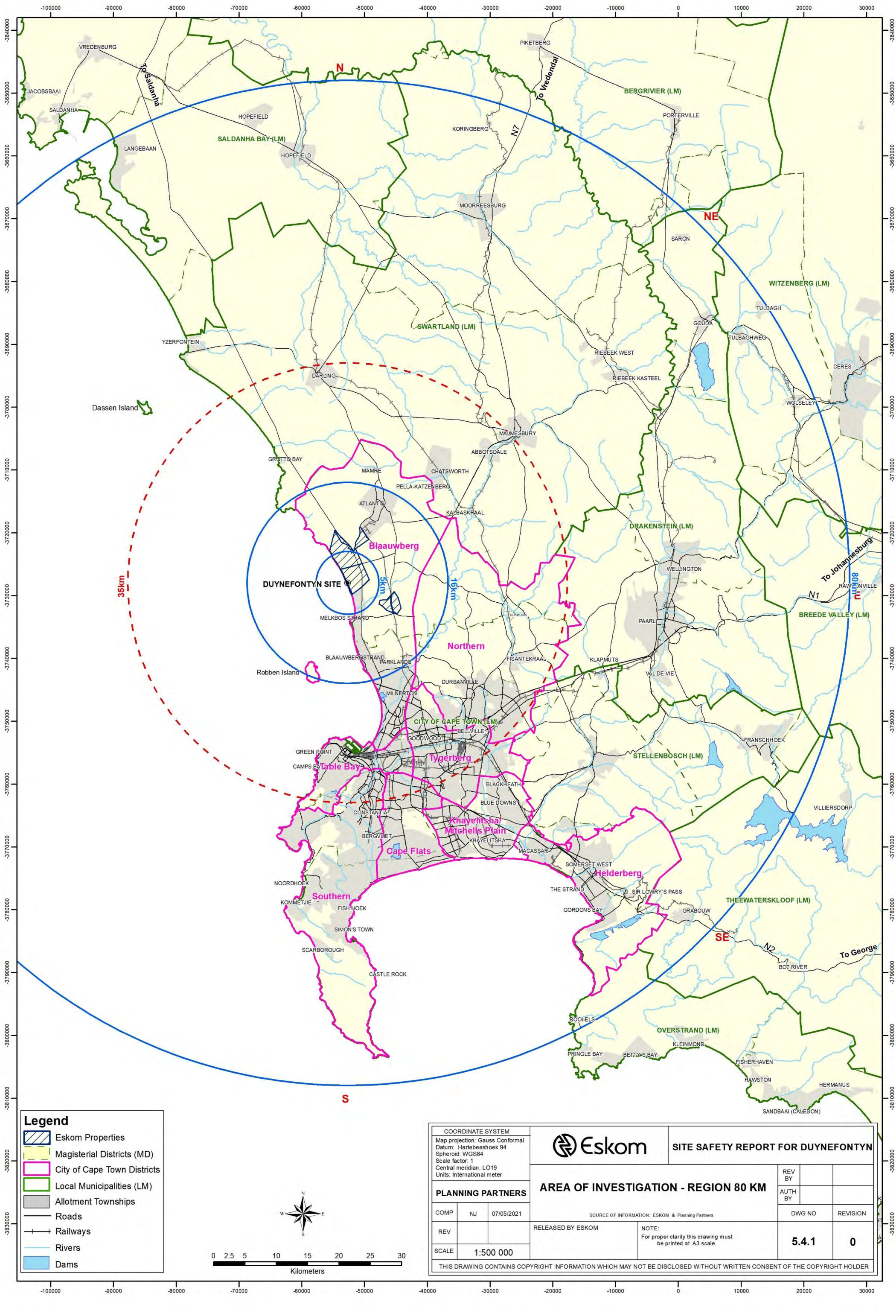
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- the site vicinity – within a 16 km radius (***Drawing 5.4.2***).

Population distribution, population density and population growth are considered in more detail in the site vicinity, where appropriate.

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COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter	Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN
PLANNING PARTNERS	AREA OF INVESTIGATION - REGION 80 KM	REV BY / AUTH BY
COMP NJ 07/05/2021	SOURCE OF INFORMATION: ESKOM & Planning Partners	DWG NO: 5.4.1 / REVISION: 0
REV	RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.
SCALE 1:500 000		

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-3700000 -3710000 -3720000 -3730000 -3740000 -3750000 -3760000 -3770000

To Saldanha

DARLING

SWARTLAND (LM)

MALMESBURY (MD)

MALMESBURY

ABBOTSDALE

GROTTO BAY

MAMRE

CHATSWORTH

PELLA-KATZENBERG

ATLANTIS

KALBASKRAAL

Blaauwberg

DUYNEFONTYN SITE

5km

16km

35km

MELKBOS STRAND

KLIPHEUWEL

Northern

BLAAUWBERGSTRAND

PARKLANDS

FISANTEKRAAL

Robben Island

CAPE (MD)

BELLVILLE (MD)

DURBANVILLE

MILNERTON

BELLVILLE

GOODWOOD

STELLENBOSCH (LM)

KUILS RIVER (MD)

GREEN POINT

GOODWOOD (MD)

Tygerberg

Table Bay

CAMPS BAY

STELLENBOSCH (MD)

BLACKHEATH

CONSTANTIA

WYNBERG (MD)

BERGVLIET

N W E S

0 1 2 4 6 8 10

Kilometers

Legend

- Eskom Properties
- Magisterial Districts (MD)
- City of Cape Town Districts
- Local Municipalities (LM)
- Allotment Townships
- Roads
- Railways
- Rivers
- Dams

COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter	Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN
PLANNING PARTNERS	AREA OF INVESTIGATION - VICINITY 16 KM	REV BY / AUTH BY
COMP NJ 07/05/2021	SOURCE OF INFORMATION: ESKOM & Planning Partners	DWG NO: 5.4.2 / REVISION: 0
REV	RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.
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5.4.4.2 Data Sources

The information presented has been obtained from national, regional and local studies and is based on official sources. Where data gaps were identified, primary research and/or surveys have been conducted.

The 2011 census (Statistics South Africa, 2011) provides the baseline data for the description of the population distribution within the site region. This population census is the most recent census undertaken for the region. The smallest available, spatially referenced data, i.e. Small Area Layer (SAL) data, have been obtained. It should be noted that at the time of writing the census 2022 small area layer data were not available. This report will undergo a complete update once the census 2022 small area layer is available.

Data on the current population around the site have been obtained from the following main sources:

- Statistics South Africa (StatsSA);
- provincial, district and local authorities;
- desktop studies;
- relevant strategic spatial planning reports;
- South African Tourism;
- Cape Town Tourism;
- WESGRO;
- specific field surveys, e-mail surveys and telephonic surveys;
- aerial photographic survey;
- Eskom's nuclear sites investigation reports;
- available data about land and water use, adjacent sea use, nearby transportation, industrial and military facilities, exclusion area authority control and EP, presented in other sections and chapters of the DSSR.

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Projections were made on the basis of estimated population growth rates and plans for possible development in the region. The projected figures for the two categories of permanent population and temporary population were extrapolated separately according to the data available.

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5.4.4.3 Presentation of Data

Where appropriate, demographic data have been presented in tabular format, figures and drawings and inform the creation of a Geographical Information System (GIS) database that forms part of the baseline for the DSSR (Eskom, 2014) (Eskom, 2022b).

The demographic data have been presented in terms of distance and direction from the nuclear installation(s). Measurements have been taken in a straight line from the predefined co-ordinate or site centroid (i.e. X: -52727.4000; Y: -3727966.6500) that is a constant from which all distances relative to the nuclear installation(s) have been presented, unless specifically noted otherwise.

The demographic information is provided in terms of segments, sectors and annuli as illustrated in ***Figure 5.4.1*** (Eskom, 2014) (Eskom, 2022b).

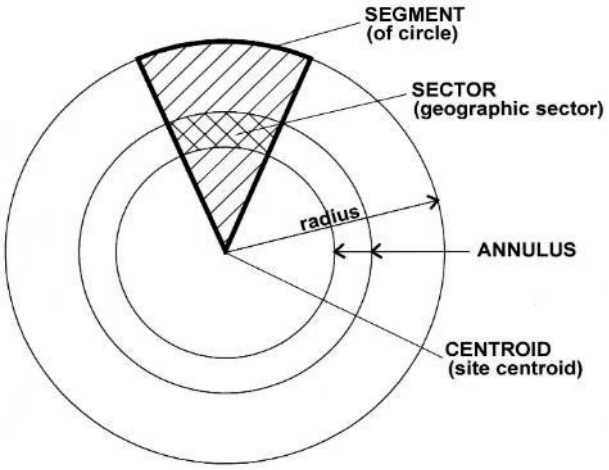


Figure 5.4.1
Illustration of Terms: Segment, Sector, Annulus, Radius and Centroid

The segments, sectors, radii and annuli, within which data have been collected, have been chosen based on national practices, with account taken of special situations. In order to align the analysis and presentation of demographic data with complementary data presented in ***Section 5.5*** (Land and Water Use) and ***Section 5.6*** (Adjacent Sea Use) of the DSSR the following have been considered (Eskom, 2014) (Eskom, 2022b):

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- a 2.5 km and 5 km radius and a 5° and 22.5° grid for the site region within an 80 km radius;
- a 2 km, 5 km, 6.5 km, 10 km and 16 km radius and a 22.5° grid for the site vicinity, i.e. 16 km radius.

The radii noted above also include the EP zones.

For the purpose of the evaluation and demonstration of the feasibility of the emergency plan for the site that is presented in ***Chapter 8*** (Emergency Planning) specific attention was paid to the following:

- population distribution and density in the site vicinity and site region;
- distance of the site from population centres;
- special groups of the population who are difficult to evacuate or shelter, such as persons in hospitals and homes for the aged.

Figures visually illustrate the population data contained in the relevant database and tables. Where applicable, shading indicates different population numbers or densities, i.e. the darker the shading, the higher or denser the population.

It should also be noted that various sectors contain land as well as ocean. Note that population figures are centred within a sector and it may therefore appear that members of the population are allocated to the ocean. Where this is the case the sector presents the data relevant to that sector over the land area, excluding the ocean area. This principle was applied throughout this section. Where appropriate, population density figures are averaged over the land area of the sector and not the extent of the sector (i.e. excluding ocean areas).

5.4.5 Current Permanent Population Distribution

Demography data for the most recent census, i.e. 2011 Census (Statistics South Africa, 2011), was investigated to determine and characterise the permanent population for the site region and site vicinity around the nuclear installation(s) for 2011 (Planning Partners, 2020a). The estimated population distribution for 2018 is presented in ***Subsection 5.4.8*** (Projected Population Distribution).

The methodology for the allocation of population data to specific sectors

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outlined in the Technical Specification for Site Safety Reports: Demography (Eskom, 2014) (Eskom, 2022b) has been applied.

The assessment of the permanent population distribution in the site region includes the following:

- the population distribution within 5.0 km distance annuli around the site (22.5º radial grid) up to the boundary of site region (2011);
- the population distribution within 2.5 km distance annuli around the site (5º radial grid) up to the boundary of site region (2011);
- the population distribution within 2.5 km distance annuli around the site (22.5º radial grid) up to the boundary of site region (2011);
- the population distribution within 5.0 km distance annuli around the site (5º radial grid) up to the boundary of site region (2011).

The assessment of the permanent population distribution in the site vicinity includes, in addition, the following:

- the population per suburb (2011);
- the gender distribution per suburb (2011);
- the age distribution per suburb (2011);
- the type of dwelling per suburb (2011).

Population densities and centres have also been analysed. The characterisation of the population densities and centres includes the following:

- vicinity population and population density per sector (2011);
- regional population and population density per sector (2011).

5.4.5.1 Current Permanent Population

The 2011 population distribution and characteristics are presented in ***Drawings 5.4.3*** to ***5.4.7***, ***Figures 5.4.2*** to ***5.4.9*** and ***Appendices 5.4.A*** to ***5.4.H***.

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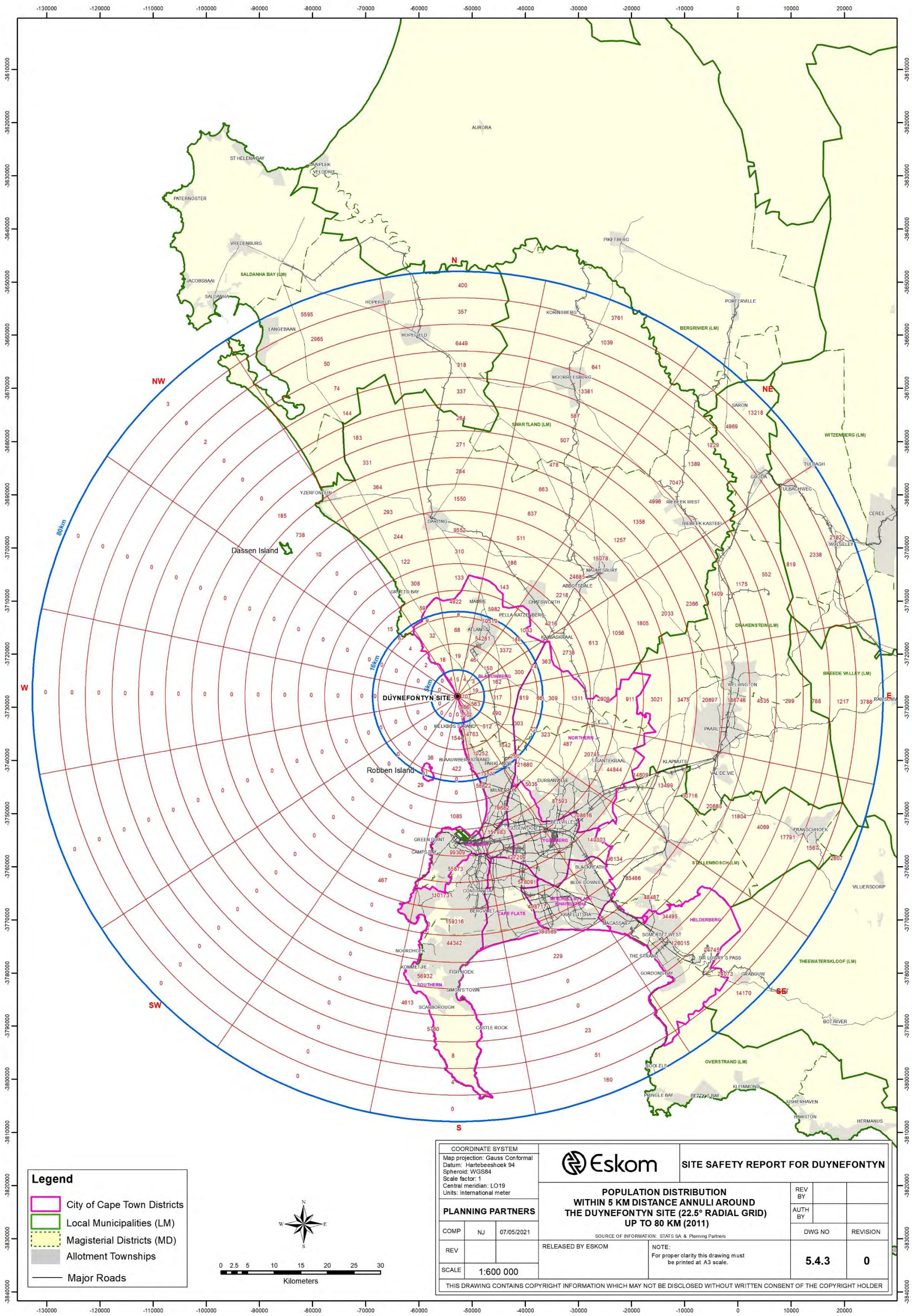
The small difference in the total population numbers as presented in ***Appendices 5.4.A*** to ***5.4.D*** is due to a combination of the following:

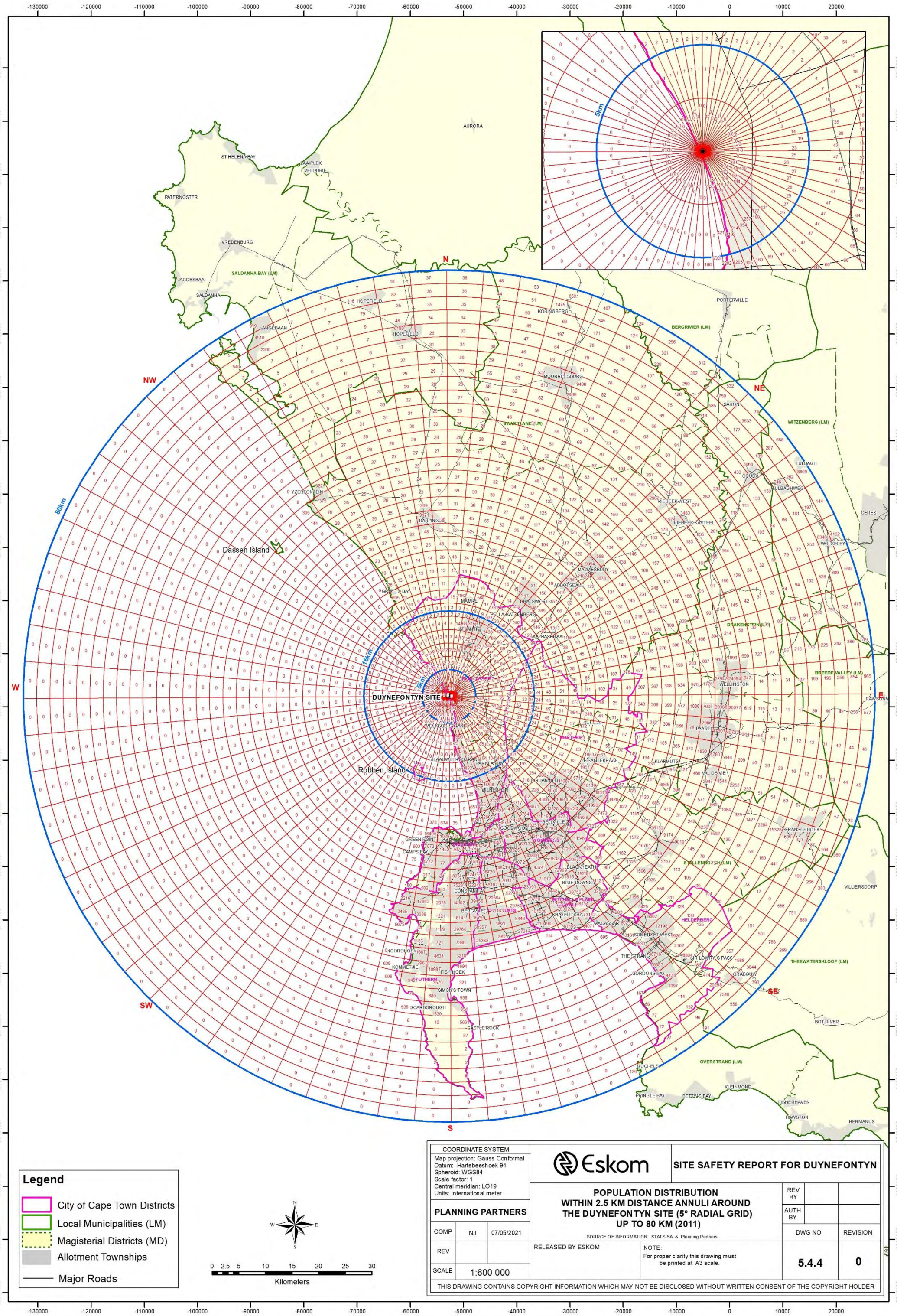
- the difference in the 'geographical' configuration between the SAL utilised by Statistics South Africa and the radial grids and its associated sectors utilised in the DSSR;
- the difference in the 'geographical' configuration of the sectors created by the different radial grids utilised in the DSSR;
- the rounding off of numbers, i.e. decimal points are not utilised.

The largest margin of difference or variance is 33 people spread over the 80 km annulus around the site, which represents a variance of approximately 0.0008 per cent. This variance is regarded as negligible.

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N
NW
NE
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SE
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80km
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8km
DUYNEFONTYN SITE
Dassen Island
Robben Island
AURORA
ST HELENA BAY
LAAIPLEK
VELDDRIF
PATERNOSTER
VREDENBURG
SALDANHA BAY (LM)
JACOBSBAAI
SALDANHA
HOPEFIELD
LANGEBAAN
PIKETBERG
PORTERVILLE
KORINGBERG
BERGRIVIER (LM)
MOORREESBURG
SWARTLAND (LM)
SARON
WITZENBERG (LM)
TULBAGH
GOUDA
TULBAGHWEG
RIEBEEK WEST
RIEBEEK KASTEEL
CERES
WOLSELEY
YZERFONTEIN
DARLING
MALMESBURY
ABBOTSDALE
GROOTTO BAY
MAMRE
CHATSWORTH
PELLA KATZENBERG
ATLANTIS
KALBASKRAAL
DRAKENSTEIN (LM)
BLAAUWBERG
BREEDE VALLEY (LM)
WELLINGTON
PAARL
RAWSONV
MELKBOS STRAND
BLAAUWBERGSTRAND
PARKLANDS
NORTHERN
FISANTEKRAAL
KLAPMUTS
VAL DE VIE
DURBANVILLE
MILNERTON
BELLVILLE
GOODWOOD
GREEN POINT
CAMPS BAY
TYGERBERG
BLACKHEATH
BLUE DOWNS
CONSTANTIA
BERGVLIET
CAPE FLATS
KHAYELITSHA
MITCHELL'S PLAIN
MACASSAR
SOMERSET WEST
HELDERBERG
STELLENBOSCH (LM)
FRANSCHHOEK
VILLIERSDORP
THE STRAND
GORDONS BAY
SIR LOWRY'S PASS
GRABOUW
THEEWATERSKLOOF (LM)
BOT RIVER
OVERSTRAND (LM)
ROOI-ELS
PRINGLE BAY
BETTY'S BAY
KLEINMOND
FISHERHAVEN
HAWSTON
HERMANUS
NOORDHOEK
KOMMETJIE
FISH HOEK
SOUTHERN
SIMON'S TOWN
SCARBOROUGH
CASTLE ROCK
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6449
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13381
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587
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271
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310
15078
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24685
552
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143
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1175
1409
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2033
1805
1056
613
2738
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3372
148
54281
1033
4216
10519
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2218
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157983
140303
99309
427209
96134
55873
85466
578091
110173
48487
498717
34495
159316
383589
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Kilometers
Legend
City of Cape Town Districts
Local Municipalities (LM)
Magisterial Districts (MD)
Allotment Townships
Major Roads
COORDINATE SYSTEM
Map projection: Gauss Conformal
Datum: Hartebeeshoek 94
Spheroid: WGS84
Scale factor: 1
Central meridian: LO19
Units: International meter
PLANNING PARTNERS
COMP NJ 07/05/2021
REV
SCALE 1:600 000
Eskom
SITE SAFETY REPORT FOR DUYNEFONTYN
POPULATION DISTRIBUTION
WITHIN 5 KM DISTANCE ANNULI AROUND
THE DUYNEFONTYN SITE (22.5° RADIAL GRID)
UP TO 80 KM (2011)
SOURCE OF INFORMATION: STATS SA & Planning Partners
REV BY
AUTH BY
DWG NO
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Legend

- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships
- Major Roads

0 2.5 5 10 15 20 25 30
Kilometers

COORDINATE SYSTEM		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter		
PLANNING PARTNERS		
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Eskom

SITE SAFETY REPORT FOR DUYNEFONTYN

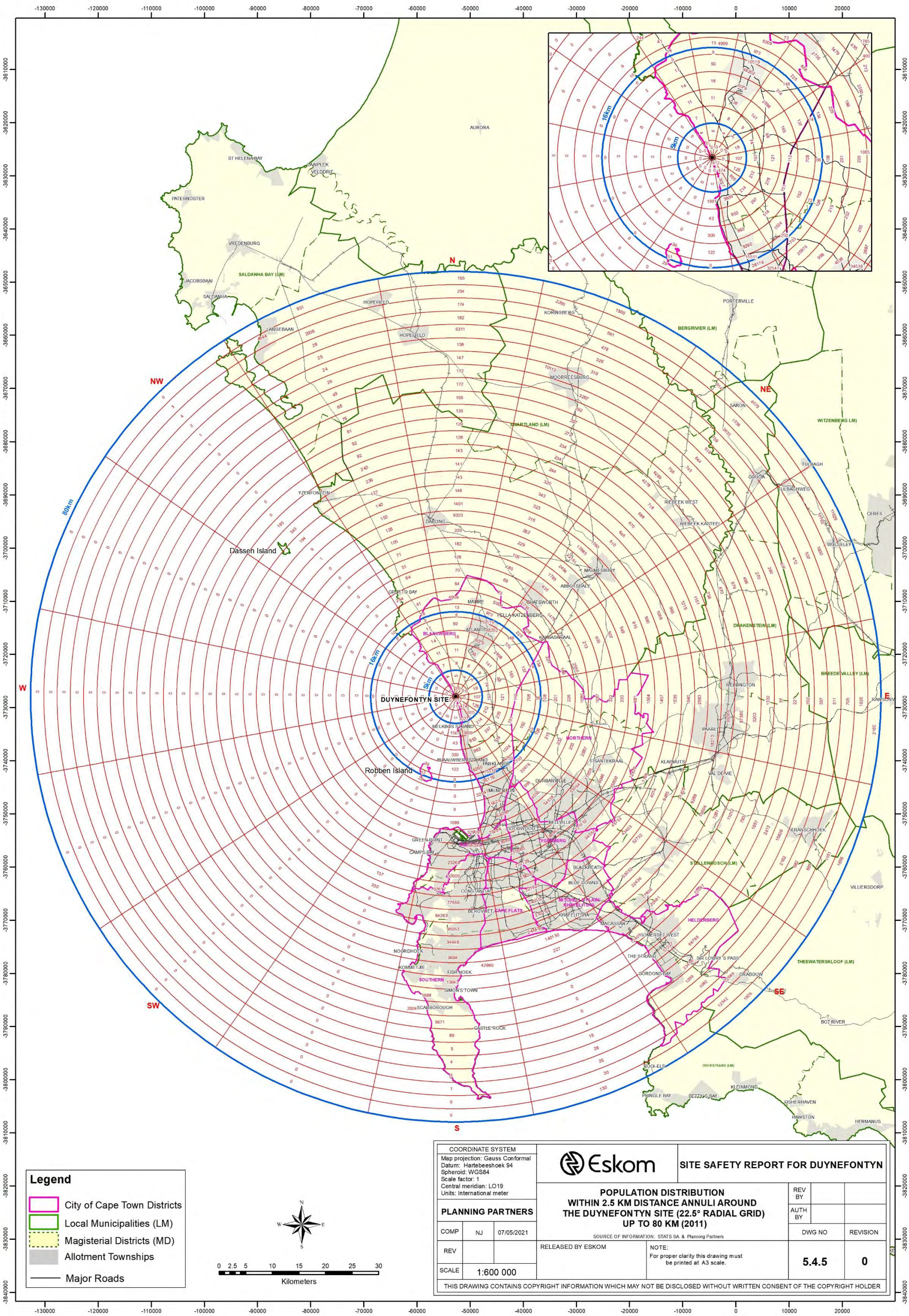
POPULATION DISTRIBUTION WITHIN 2.5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (5° RADIAL GRID) UP TO 80 KM (2011)

SOURCE OF INFORMATION: STATS SA & Planning Partners

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Legend

- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships
- Major Roads

N, W, E, S

0 2.5 5 10 15 20 25 30

Kilometers

COORDINATE SYSTEM		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter		
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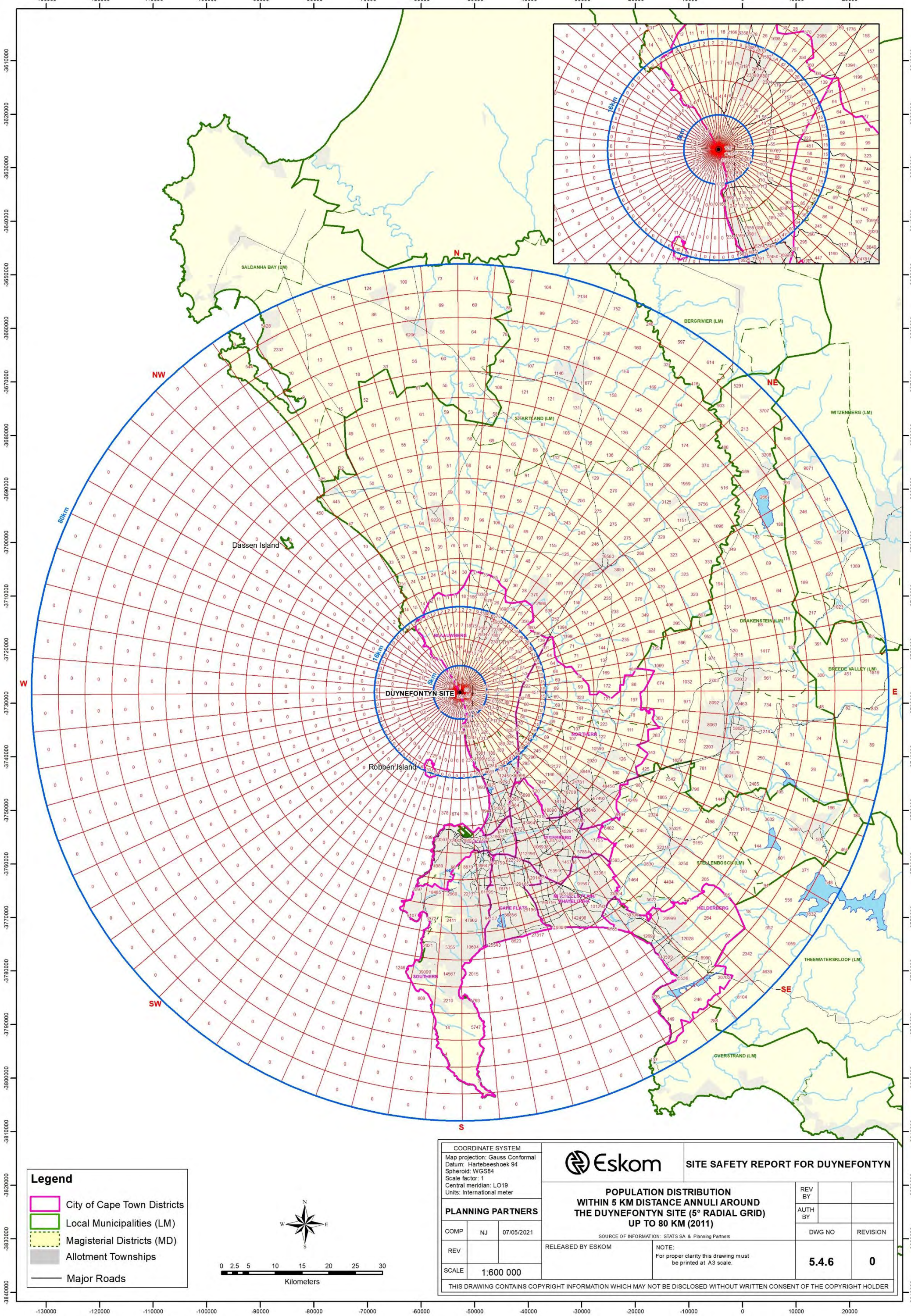
SITE SAFETY REPORT FOR DUYNEFONTYN

POPULATION DISTRIBUTION WITHIN 2.5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (22.5° RADIAL GRID) UP TO 80 KM (2011)

SOURCE OF INFORMATION: STATS SA & Planning Partners

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Legend

- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships
- Major Roads

N / W / E / S

0 2.5 5 10 15 20 25 30

Kilometers

COORDINATE SYSTEM	Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter	POPULATION DISTRIBUTION WITHIN 5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (5° RADIAL GRID) UP TO 80 KM (2011) SOURCE OF INFORMATION: STATS SA & Planning Partners	REV BY / AUTH BY
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GROTTO BAY
MAMRE
MAMRE
SWARTLAND (LM)
GREATER
GREATER CHATSWORTH
CHATSWORTH
PELLA-KATZENBERG
16km
5km
WESFLEUR
16216
9994
2072
192
11638
8562
12388
1674
4689
632
70
ATLANTIS INDUSTRIAL
1563
BLAAUWBERG
R304
R27
N7
0
DUYNEFONTYN SITE
570
PHILADELPHIA
1549
283
1774
1056
MELKBOSCH STRAND
M19
NORTHERN
7980
3128
485
323
BLAAUWBERGSTRAND
2107
MILNERTON
BIG BAY
2133
1969
4700
4878
3204
4970
765
33
628
PARKLANDS
Robben Island
87
MILNERTON
RICHMOND PARK
BURGUNDY
MONTAGUE GARDENS

Legend

- 5km EPZ
- 16km EPZ
- Suburbs
- Roads
- Railways
- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships

N W E S

0 0.5 1 2 3 4 5
Kilometers

COORDINATE SYSTEM	Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter	POPULATION PER SUBURB WITHIN 16 KM FROM THE DUYNEFONTYN SITE (2011) SOURCE OF INFORMATION: STATS SA (2011 Census)	REV BY AUTH BY
PLANNING PARTNERS		DWG NO: 5.4.7 / REVISION: 0
COMP NJ 07/05/2021	RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.
REV		
SCALE 1:120 000		

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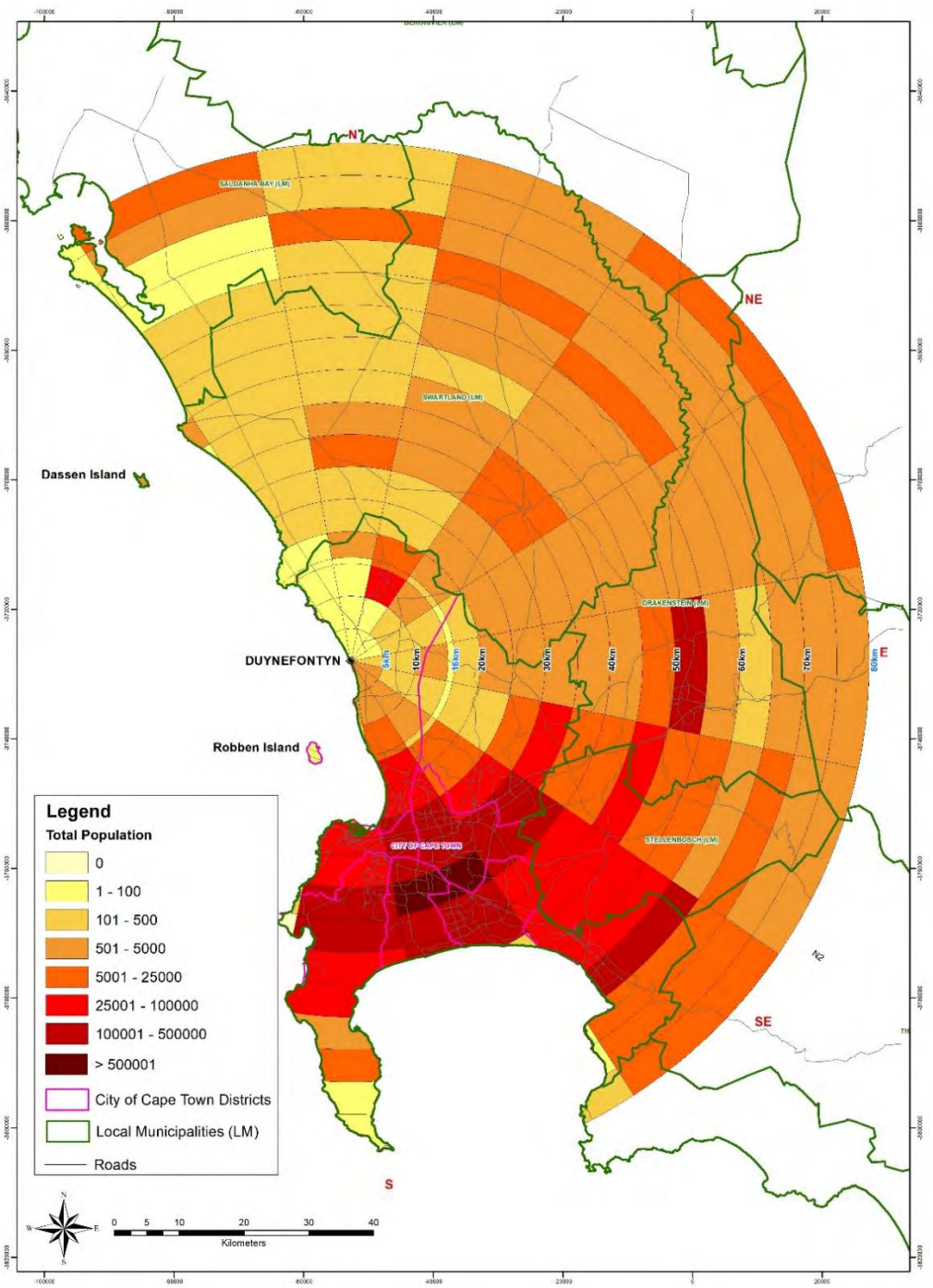


Figure 5.4.2

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Population Distribution Within 5 km Distance Annuli Around the Duynefontyn Site (22.5º Radial Grid) up to 80 km (2011)

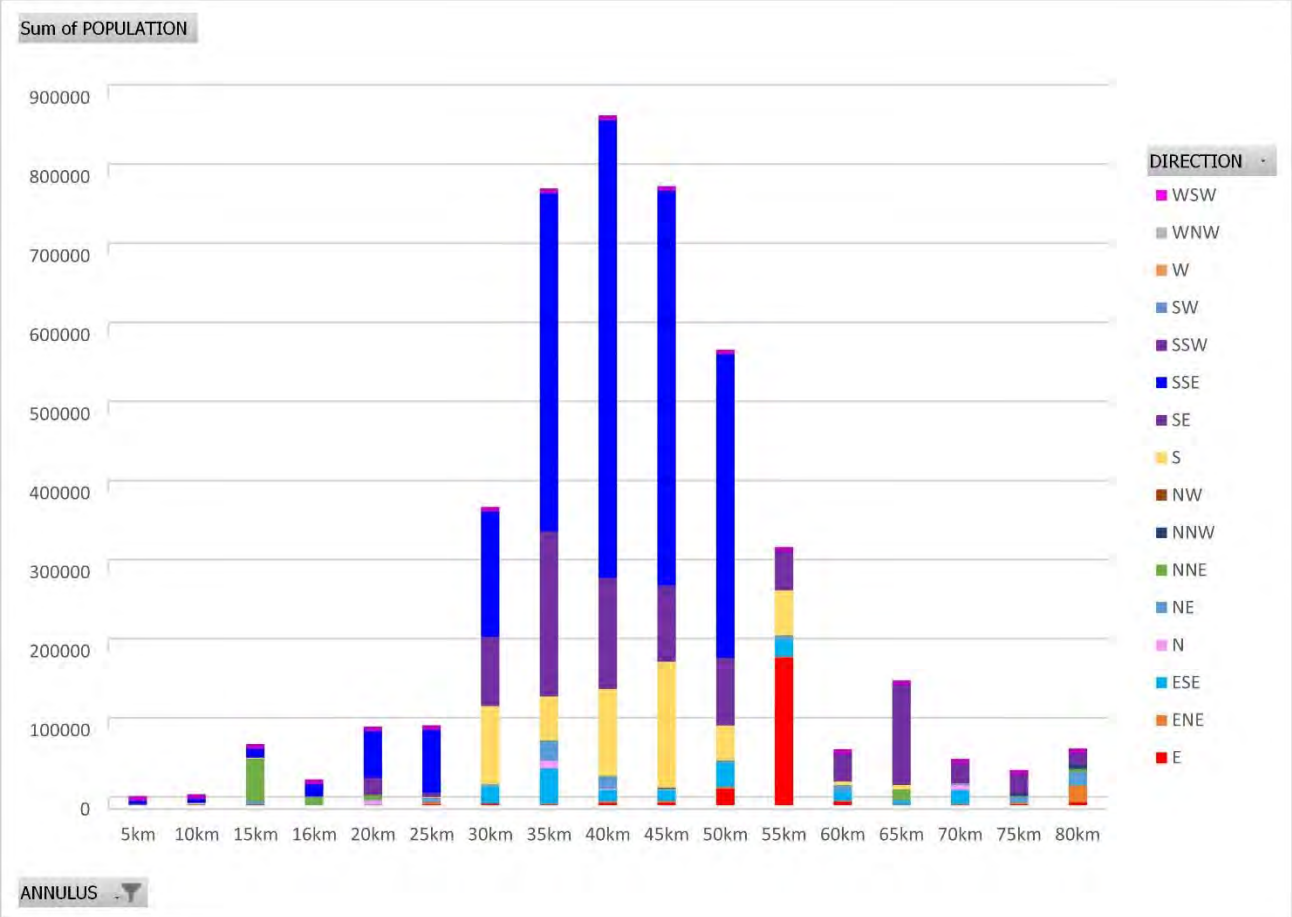


Figure 5.4.3
Population Distribution Within 5 km Distance Annuli Around the Duynefontyn Site (22.5º Radial Grid) up to 80 km (2011)

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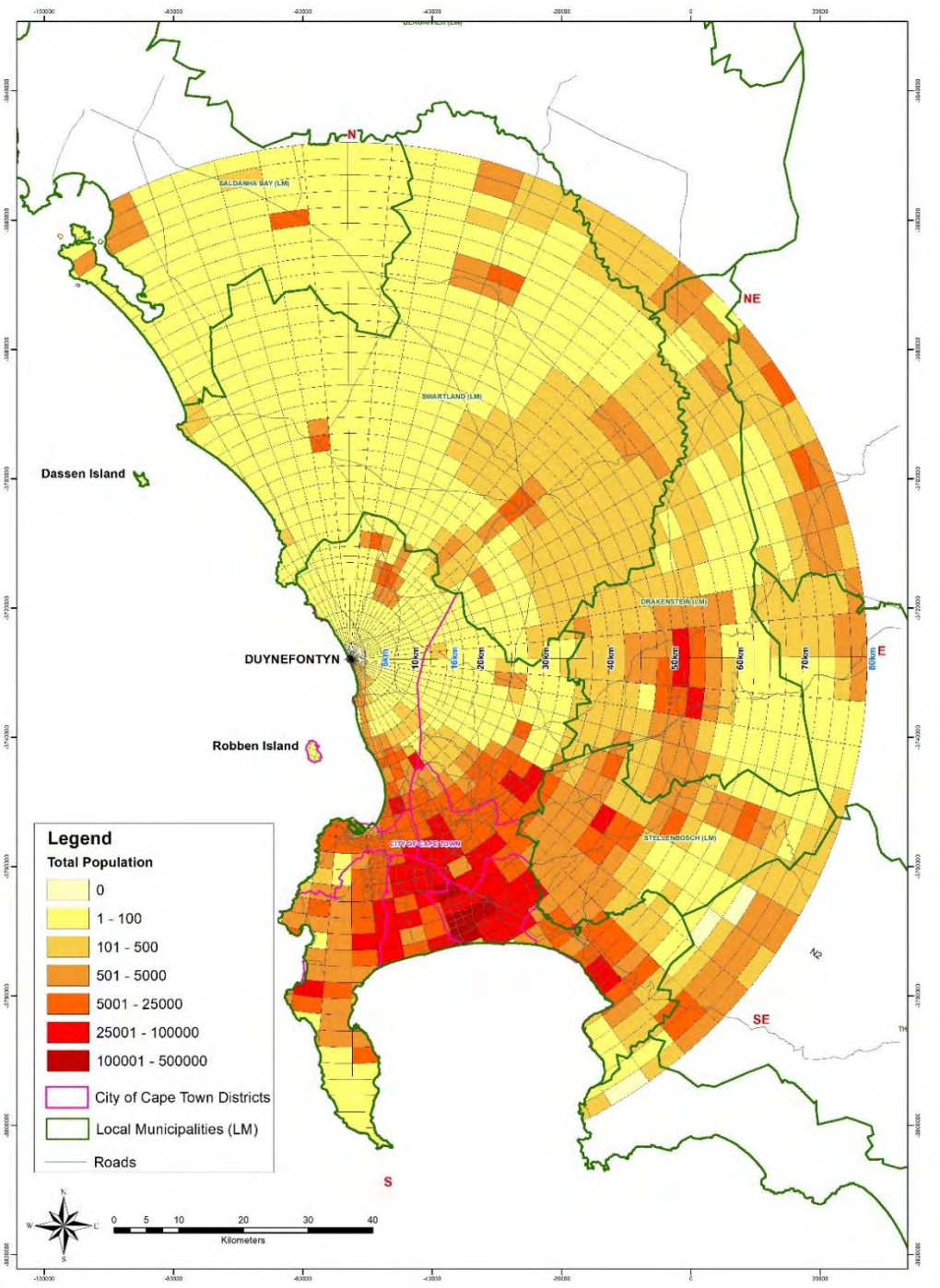


Figure 5.4.4

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Population Distribution Within 2.5 km Distance Annuli Around the Duynefontyn Site (5º Radial Grid) up to 80 km (2011)

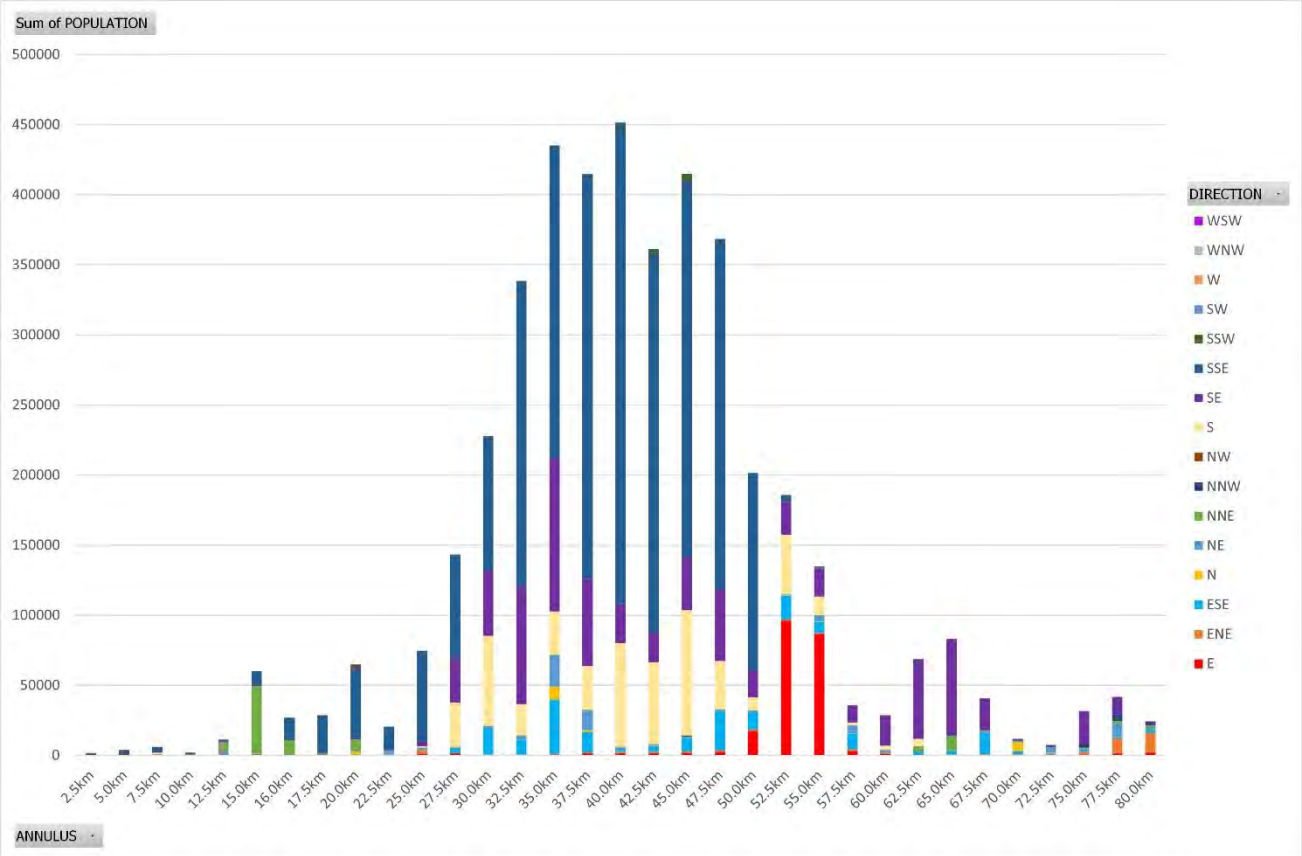


Figure 5.4.5
Population Distribution Within 2.5 km Distance Annuli Around the Duynefontyn Site (5º Radial Grid) up to 80 km (2011)

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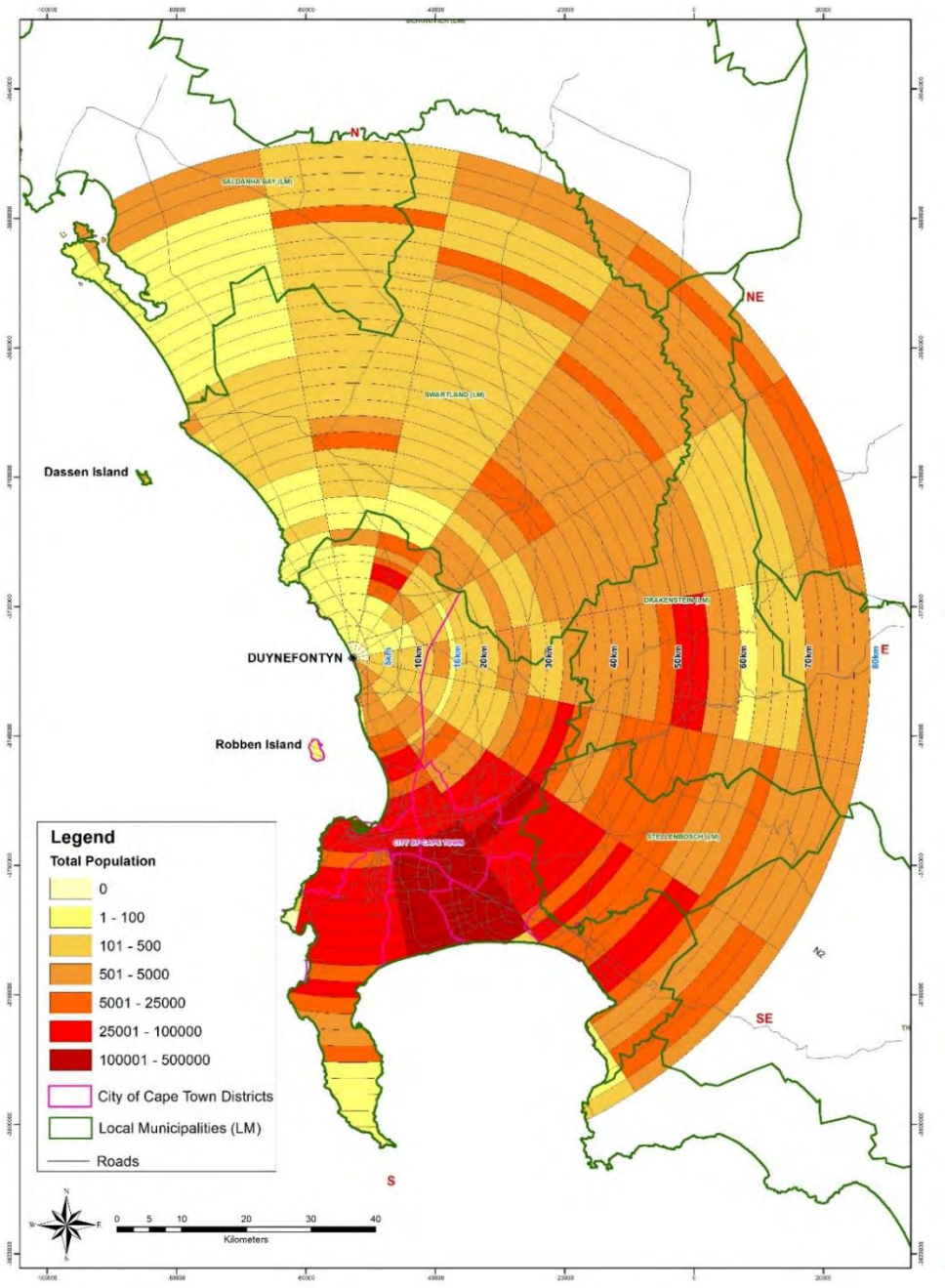


Figure 5.4.6
Population Distribution Within 2.5 km Distance Annuli Around the Duynefontyn Site (22.5º Radial Grid) up to 80 km (2011)

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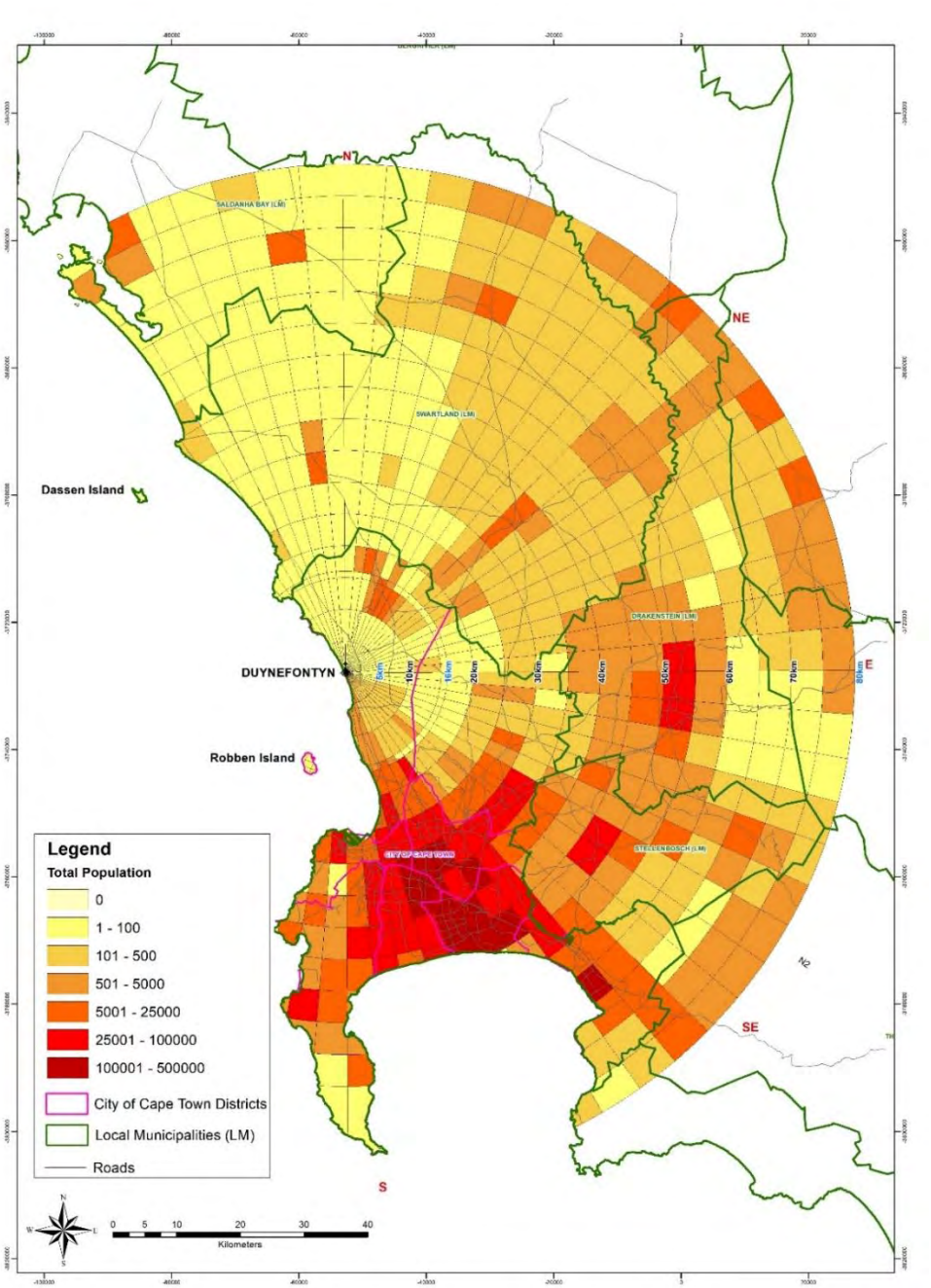


Figure 5.4.7
Population Distribution Within 5 km Distance Annuli Around the Duynefontyn Site (5º Radial Grid) up to 80 km (2011)

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Site Region

The analysis showed that a population of approximately 4 351 410 persons resided within 80 km of the site in 2011. The analysis contained in the DSSR Section 5.4, Rev 0 (Eskom, 2022a) notes that the analysis of the preceding 2001 census showed that a population of approximately 3 212 270 persons resided within 80 km of the site in 2001. This represents an annual population growth rate of 3.6 per cent within 80 km of the site between 2001 and 2011.

The largest population concentrations are east-southeast, southeast, south-southeast (highest) and south of the site, coinciding with urban settlements within the City of Cape Town. In addition, the population distribution shows sharp spikes around main towns. The main settlements with more than 5 000 persons are presented in ***Table 5.4.1*** below.

Table 5.4.1
Main Settlements in the 80 km Radius (2011)

Settlement	Distance (km)	Direction	Approximate Number of Persons
Atlantis	7.5 to 16	NNE	67 490
Urban portions of the City of Cape Town	10 to 70	S/SSE/SE	3 628 680
Mamre	17.5 to 20	N	9 090
Fisantekraal	27.5 to 32.5	ESE	12 620
Malmesbury/Abbotsdale	27.5 to 40	NE	40 520
Darling	30 to 37.5	N	10 680
Klapmuts	40 to 45	ESE	8 940
Paarl/Mbekweni/Wellington	42.5 to 57.5	E/ESE	210 380
Stellenbosch/Kayamandi/Cloetesville	45 to 52.5	ESE/SE	79 800
Jamestown/De Zalze	47.5 to 52.5	SE	5 440
Riebeek Kasteel	50 to 57.5	NE/ENE	5 470
Riebeek West	50 to 57.5	NE	5 080
Kylemore/Lanquedoc/Pniel	52.5 to 57,5	ESE	11 850
Moorreesburg	57.5 to 67.5	NNE	13 220

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Settlement	Distance (km)	Direction	Approximate Number of Persons
Franschhoek	65 to 75	ESE	17 690
Hopefield	65 to 77.5	NNW/N	6 590
Langebaan	70 to 80	NW/NNW	8 310
Grabouw	72.5 to 77.5	SE	33 670
Wolseley	72.5 to 80	ENE	12 760
Saron	75 to 80	NE	8 390
Tulbagh	77.5 to 80	NE/ENE	8 810

Site Vicinity

The assessment of the permanent population distribution in the site vicinity (16 km radius) includes, in addition to the above, the following:

- the population per suburb (2011);
- the gender distribution per suburb (2011);
- the age distribution per suburb (2011);
- the type of dwelling per suburb (2011).

The results show that approximately 112 610 persons resided within the site vicinity in 2011 (refer to ***Drawing 5.4.7*** and ***Appendix 5.4.E***). The preceding 2001 census showed that a population of approximately 79 040 persons resided within 16 km of the site in 2001 (Eskom, 2022a). This represents a population growth rate of 4.3 per cent within 16 km of the site between 2001 and 2011.

The suburbs of Avondale, Protea Park, Robinvale, Saxonsea and Sherwood in Atlantis to the north-northeast contained the highest population numbers, i.e. approximately 11 640, 12 390, 8 560, 16 220 and 9 990 persons, respectively.

The population gender composition is relatively evenly distributed, with females having a slightly higher count at approximately 57 670 females (51 per cent) against approximately 54 940 males (49 per cent) (refer to ***Appendix 5.4.F***).

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The majority of the population within the site vicinity (approximately 69 per cent) is under the age of 40 years (refer to ***Appendix 5.4.G***). The largest age group is between the ages of 20 and 29 years (approximately 19 per cent) and the second largest age group is between 0 and 9 years (approximately 18 per cent).

According to the data, approximately 32 260 dwellings are found within the site vicinity. The majority of the dwellings (approximately 92 per cent) are of a formal nature (such as houses, townhouses and flats) and approximately 8 per cent of the dwellings are of an informal nature (such as in backyards and informal settlements) (refer to ***Appendix 5.4.H***).

The small difference in the total population numbers presented in ***Appendices 5.4.E*** to ***5.4.G*** is due to a combination of the following:

- the difference in the 'geographical areas', i.e. neighbourhoods utilised by Statistics South Africa and the geographical area formed by the 16 km radial for the site vicinity;
- the rounding off of numbers, i.e. decimal points are not utilised.

The largest margin of difference or variance is 3 people spread over the 16 km annulus around the site, which represents a variance of approximately 0.003 per cent. This variance is regarded as negligible.

5.4.5.2 Population Density

Population densities have been analysed to determine whether they exceed the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) contained in ***Subsection 5.4.3.2*** (Guideline Documents). In this regard, emphasis is placed on the benchmark of a density of approximately 200 persons/km² and not the size of the population centre, as a large portion within the 80 km radius consists of ocean, i.e. does not contain residents. Please note that the referenced documents act only as a guide and are not an NNR requirement.

The analysis of the population density around the site includes the following:

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- the vicinity population and population density (2011);
- the regional population and population density (2011).

The vicinity population density has been analysed for the 2 km, 5 km, 6.5 km, 10 km and 16 km distance annuli and 22.5º radial grids. The results are presented in ***Figure 5.4.8*** and ***Table 5.4.2*** below.

The regional population density is presented for 5 km distance annuli and 22.5º radial grids within 80 km from the site. The results for this analysis are presented in ***Figure 5.4.9*** and ***Table 5.4.2*** below.

The following indicates the population density with respect to various annuli within 80 km from the site centroid as extracted from the results of the analysis:

- **2 km Radius**

  As no persons reside within the 2 km radius, the average population density is 0 persons/km^2 (2011).

- **5 km Radius**

  The average population density within the 5 km radius (a land area of approximately 49 km^2) is 116 persons/km^2 (2011).

- **6.5 km Radius**

  The average population density within the 6.5 km radius (a land area of approximately 79 km^2) is 72 persons/km^2 (2011).

  It is noted that two localised sectors (i.e. 2 to 5 km south-southeast and 2 to 5 km southeast) exceed a population density of 200 persons/km^2.

- **16 km Radius**

  The average population density within the 16 km radius (a land area of approximately 498 km^2) is 225 persons/km^2 (2011).

- **35 km Radius**

  The average population density within the 35 km radius (a land area

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of approximately 2 287 km^2) is 632 persons/km^2 (2011).

- **50 km Radius**

  The average population density within the 50 km radius (a land area of approximately 4 740 km^2) is 772 persons/km^2 (2011).

- **80 km Radius**

  The average population density within the 80 km radius (a land area of approximately 11 004 km^2) is 395 persons/km^2 (2011).

Based on 2011 census data (Statistics South Africa, 2011) the site conforms to the abovementioned international guidance for the 6.5 km radius. The site does, however, not conform to these guidelines for the 16 km, 35 km and 50 km radii. Please note that the referenced documents act only as a guide and are not an NNR requirement.

Table 5.4.2
Permanent Population Density (2011)

	Radius						
	2 km	**5 km**	**6.5 km**	**16 km**	**35 km**	**50 km**	**80 km**
Land Area (km²)	7	49	79	498	2 287	4 740	11 004
No. of People	0	5 670	5 670	111 840	1 445 000	3 657 520	4 351 410
Density (people/km²)	**0**	**116**	**72**	**225**	**632**	**772**	**395**

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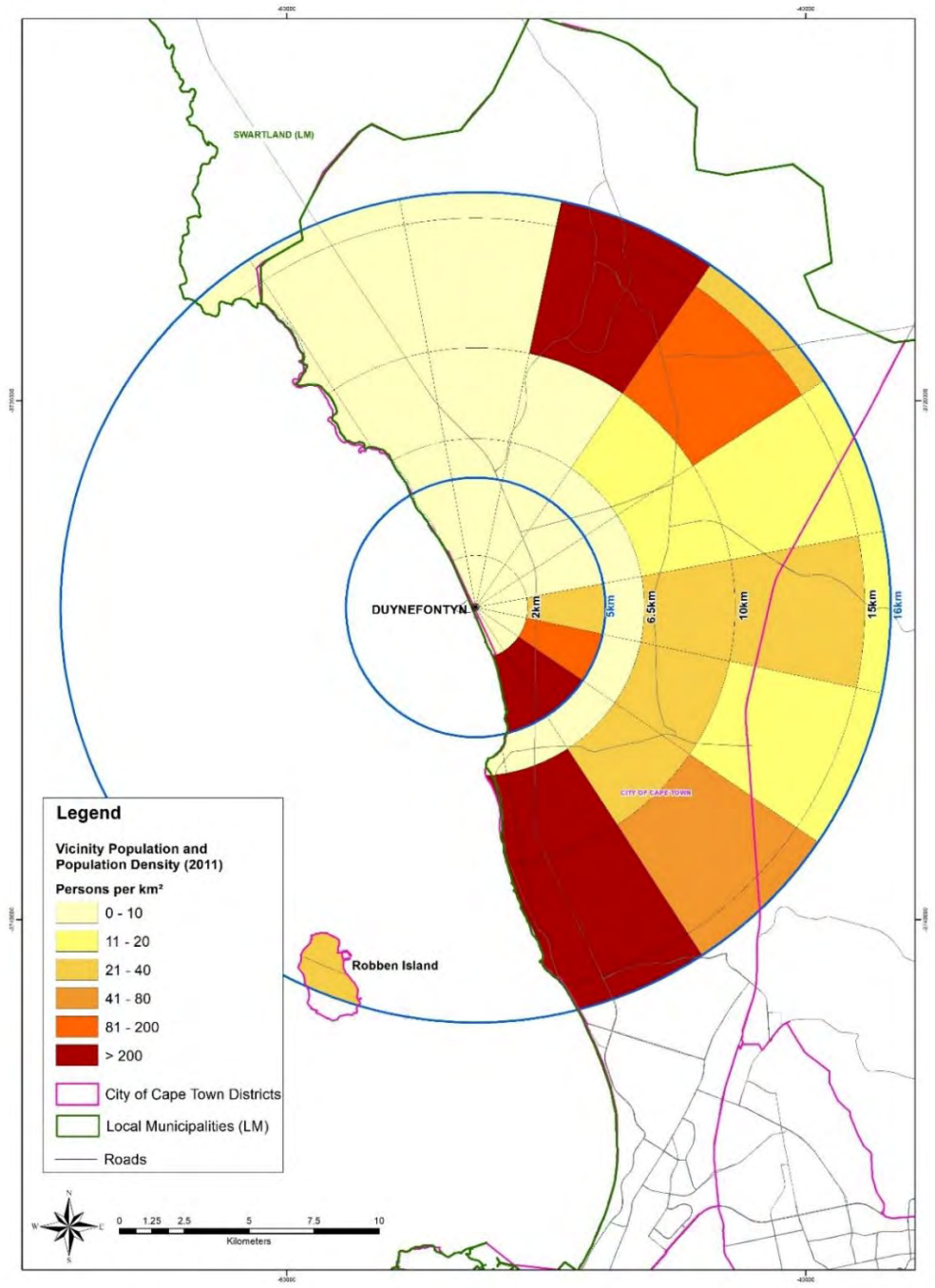


Figure 5.4.8
Vicinity Population and Population Density (2011)

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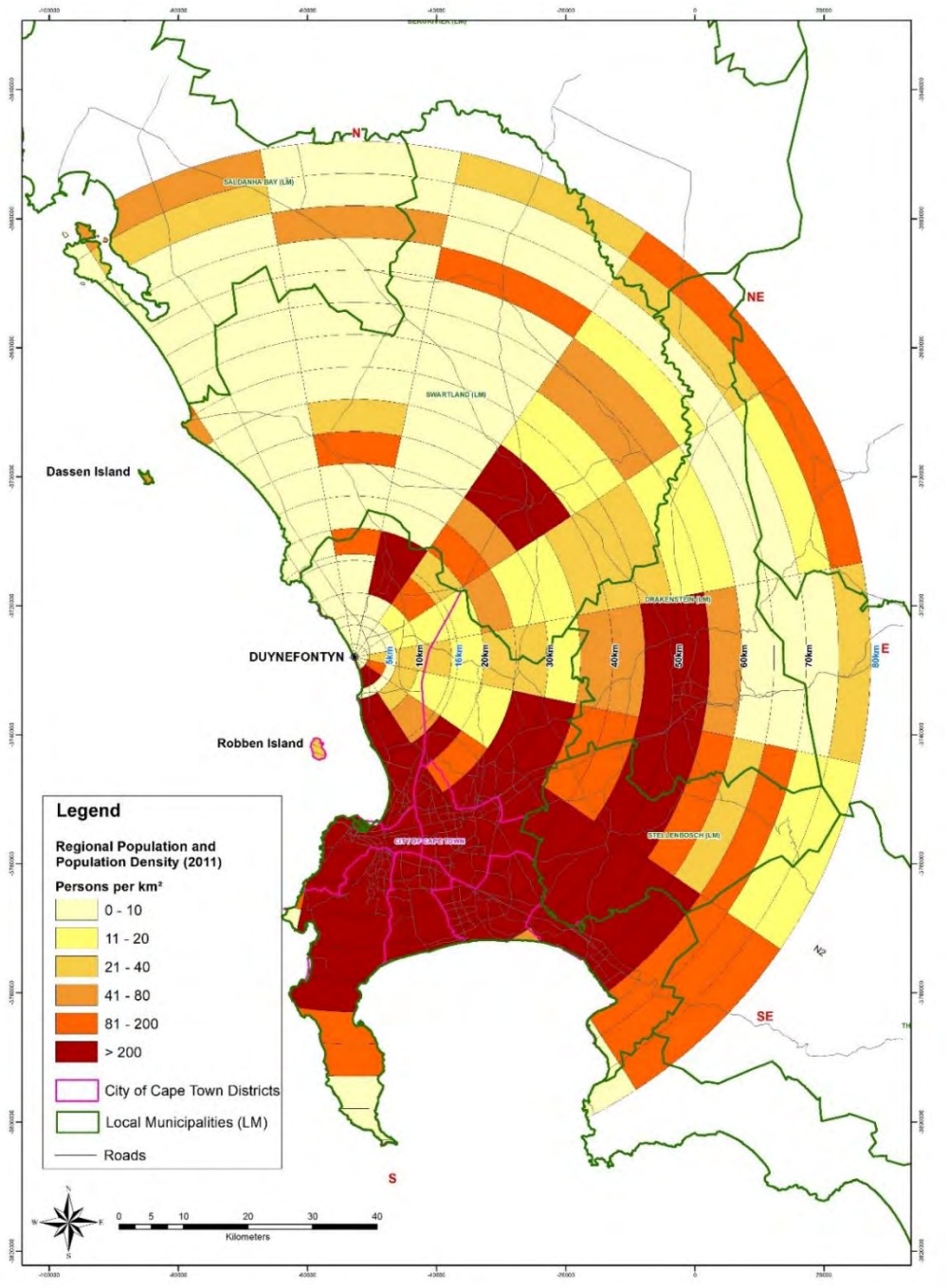


Figure 5.4.9
Regional Population and Population Density (2011)

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5.4.5.3 Population Centres

Population centres have been analysed to determine whether they exceed the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) contained in ***Subsection 5.4.3.2*** (Guideline Documents). In this regard, emphasis is placed on the benchmark of a density of approximately 200 persons/km² and not the size of the population centre as a large portion within the 80 km radius consists of ocean, i.e. does not contain residents. Please note that the referenced documents act only as a guide and are not a NNR requirement.

The following indicates the population numbers in 2011 with respect to various annuli within 80 km from the site centroid as extracted from the results of the analysis:

- **6.5 km Radius**

  The neighbourhoods of Duynefontein (approximately 1 550 persons south and south-southeast), Van Riebeeckstrand (approximately 1 770 persons south and south-southeast) and a portion of Melkbosstrand (approximately 2 180 persons south and south-southeast) form the largest settlement located within 6.5 km of the site (***Appendices 5.4.B*** and ***5.4.E*** and ***Drawings 5.4.4*** *and* ***5.4.7***).

  The total population within the 6.5 km radius is approximately 5 670 persons for 2011.

- **16 km Radius**

  The town of Atlantis (7.5 km to 16 km north-northeast) is the largest populated area within the 16 km radius with a population of approximately 67 490 persons for 2011 (***Appendix 5.4.E*** and ***Drawing 5.4.7***).

  The total population within the 16 km radius is approximately 111 840 persons for 2011.

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- **35 km Radius**

  Urban portions of the City of Cape Town located 16 to 35 km towards the south, south-southeast and southeast form the largest populated area within the 35 km radius with a population of approximately 1 254 120 persons for 2011 (***Appendix 5.4.D*** and ***Drawing 5.4.6***).

  The total population within the 35 km radius is approximately 1 445 000 persons for 2011.

- **50 km Radius**

  Urban portions of the City of Cape Town located 16 to 50 km towards the south, south-southeast and southeast form the largest populated area within the 50 km radius with a population of approximately 3 313 260 persons for 2011 (***Appendix 5.4.D*** and ***Drawing 5.4.6***).

  The total population within the 50 km radius is approximately 3 657 520 persons for 2011.

- **80 km Radius**

  Urban portions of the City of Cape Town located 16 to 70 km towards the south, south-southeast and southeast form the largest populated area within the 80 km radius with a population of approximately 3 605 100 persons in 2011 (***Appendix 5.4.D*** and ***Drawing 5.4.6***).

  The total population within the 80 km radius for 2011 is approximately 4 351 410 persons.

Based on 2011 census data (Statistics South Africa, 2011) the site conforms to the abovementioned international guidance for the 6.5 km radius. The site does, however, not conform to these guidelines for the 16 km, 35 km and 50 km radii. Please note that the referenced documents act only as a guide and are not an NNR requirement.

5.4.6 Current Temporary Population Distribution

Technical Specification for Site Safety Reports: Demography (Eskom, 2014) (Eskom, 2022b) requires the DSSR to report on temporary or

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transient population groups.

Temporary or transient population groups are those members of the public who reside for a short period of time (days or weeks) in a location (such as a camping ground) that can be identified in advance. This does not include members of the public who may be travelling through the area (International Atomic Energy Agency, 2022).

To this end, data have been collected on residential resorts, main recreational venues, main annual sport and concert events and beaches within 35 km of the nuclear installation(s) (Planning Partners, 2020b). Information regarding major shopping centres and main conference facilities within 35 km of the nuclear installation(s) are also provided. This distance satisfies the distance prescription in the Technical Specification for Site Safety Reports: Demography (Eskom, 2014) (Eskom, 2022b).

Further, the tourist population has been estimated for the site region of 80 km around the nuclear installation(s) (Planning Partners, 2021a).

5.4.6.1 Recreational Destinations

Residential Resorts

Information regarding residential resorts within 35 km of the nuclear installation(s) are presented in the subsection below and summarised in ***Table 5.4.3*** (Planning Partners, 2020b).

Their locations are illustrated in ***Drawing 5.4.8***. The numbered codes in ***Table 5.4.3*** correspond with the location of the residential resort in ***Drawing 5.4.8***.

- Ou Skip Resort & Chalets (4.24 km SSE)

Ou Skip, located in Melkbosstrand, is the nearest residential resort to the nuclear installation(s). It contains 206 camp sites, which are a combination of caravan, tent and bush camp tent sites. These sites can accommodate a maximum of 6 persons per site. The resort also has 12 chalets, which can accommodate a maximum of 6 people each. There are 78 separate units for permanent residents (maximum 2 persons each). During 2020, 106 people were living in the resort on a permanent basis. Occupancy levels vary from 90 to 100 per cent at Christmas (approximately 1 320 to 1 464 persons), 80 per cent at Easter (approximately 1 170 persons), and between 8 and 20 per cent during

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the off-peak season (approximately 120 to 300 persons).

- Silwerstroomstrand Resort & Caravan Park (11.76 km NNW)

Silwerstroomstrand Resort and Caravan Park is located on the coast towards the north-northwest from the nuclear installation(s). It contains 194 camp sites and 6 chalets. Each camp site and chalet can accommodate a maximum of 6 persons. The resort usually operates at full capacity over the Christmas holiday season (approximately 3 000 persons), while it averages a 50 per cent capacity rate over the Easter weekend (approximately 1 500 persons). For the rest of the year it averages a 30 per cent capacity rate over weekends (approximately 900 persons) and 6 per cent over weekdays (approximately 180 persons). During 2020, the resort had 4 permanent residents.

- Zonnekus Holiday Resort & Caravan Park (12.64 km SE)

This resort is located in the Morning Star smallholding area to the southeast of the nuclear installation(s). The resort has 40 camp sites and 13 chalets. The camp sites can accommodate a maximum of 6 persons per site and the chalets can sleep 6 people per unit. There are 15 separate units for permanent residents. During 2020, 17 people were living in the resort on a permanent basis. The resort has an occupancy level of approximately 57 to 100 per cent (approximately 200 to 350 persons) over the Christmas holiday season and Easter. Throughout the rest of the year occupancy levels vary from approximately 43 to 85 per cent over weekends (approximately 150 to 300 persons) and 14 per cent over weekdays (approximately 50 persons).

- Ganzekraal Holiday Resort (19.93 km NNW)

Ganzekraal Holiday Resort is located along the coast at Bokbaai towards the north-northwest from the nuclear installation(s). The resort has 54 camp sites, which can accommodate a maximum of 6 persons each. The resort also has 28 chalets, which can accommodate 6 persons each. It is a popular venue over the Christmas holiday season and Easter, during which time it is normally fully occupied (approximately 492 persons). For the rest of the year it averages an 80 per cent occupation rate over weekends (approximately 393 persons) and 30 per cent over weekdays (approximately 147 persons).

- Hardekraaltjie Holiday Resort (30.18 km SE)

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Hardekraaltjie Holiday Resort is located along Voortrekker Road in Bellville towards the southeast from the nuclear installation(s). The resort has 93 camp sites, which can accommodate a maximum of 6 persons per site. The resort also has a total of 9 chalets. The resort is fully occupied over the Christmas holiday period (approximately 627 persons). The resort has a 30 per cent occupancy rate (approximately 187 persons) over Easter, weekends and weekdays.

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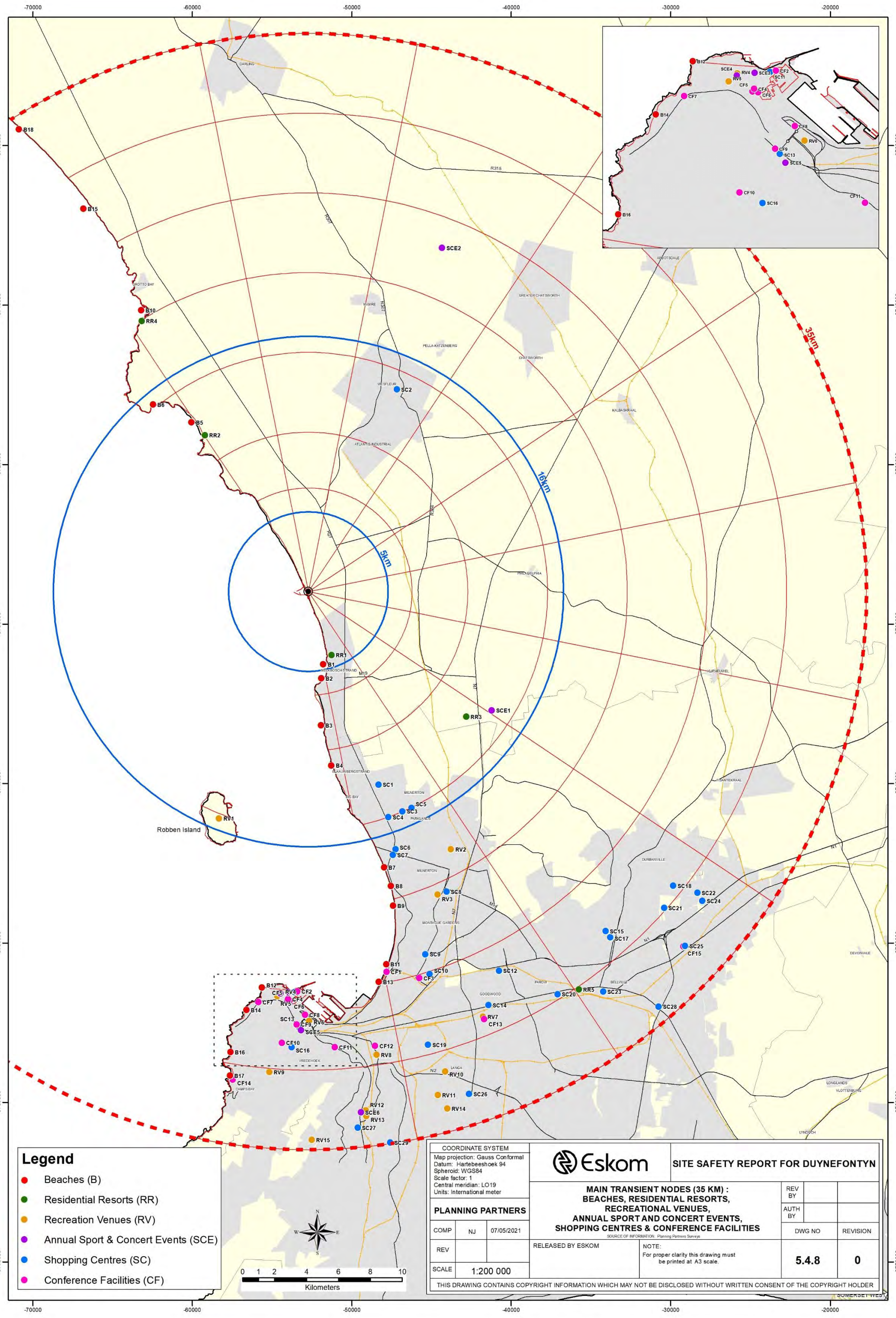
Table 5.4.3
Recreational Resorts within 35 km (2020)

Code in Drawing	Name	Distance & Direction	Average Daily Occupancy/Occupancy Rate	Occupancy Period	Comment
RR1	Ou Skip Resort & Chalets	4.24 km SSE	1 320 – 1 464 persons (90-100%)	Mid-December to mid-January	186 camp sites 20 bush camps 12 chalets 106 permanent residents
			1 170 persons (80%)	Easter	
			300 persons (20%)	weekends*	
			120 persons (8%)	weekdays*	
RR2	Silwerstroomstrand Resort & Caravan Park	11.76 km NNW	3 000 persons (100%)	Mid-December to mid-January	194 camp sites 6 chalets 4 permanent residents
			1 500 persons (50%)	Easter	
			900 persons (30%)	weekends*	
			180 persons (6%)	weekdays*	
RR3	Zonnekus Holiday Resort & Caravan Park	12.64 km SE	200 – 350 persons (57 - 100%)	Mid-December to mid-January	40 camp sites 13 chalets 17 permanent residents
			200 – 350 persons (57 - 100%)	Easter	
			150 – 300 persons (43 - 85%)	weekends*	
			50 persons (14%)	weekdays*	
RR4	Ganzekraal Holiday Resort	19.93 km NNW	492 persons (100%)	Mid-December to mid-January	54 camp sites 28 chalets
			492 persons (100%)	Easter	
			393 persons (80%)	weekends*	
			147 persons (30%)	weekdays*	
RR5	Hardekraaltjie Holiday Resort	30.18 km SE	627 persons (100%)	Mid-December to mid-January	93 camp sites 9 chalets
			187 persons (30%)	Easter	
			187 persons (30%)	weekends*	
			187 persons (30%)	weekdays*	

* Figures provided for weekends and weekdays are for off-peak periods.

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Legend

- Beaches (B)
- Residential Resorts (RR)
- Recreation Venues (RV)
- Annual Sport & Concert Events (SCE)
- Shopping Centres (SC)
- Conference Facilities (CF)

COORDINATE SYSTEM			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			MAIN TRANSIENT NODES (35 KM) : BEACHES, RESIDENTIAL RESORTS, RECREATIONAL VENUES, ANNUAL SPORT AND CONCERT EVENTS, SHOPPING CENTRES & CONFERENCE FACILITIES SOURCE OF INFORMATION: Planning Partners Surveys	REV BY		
PLANNING PARTNERS				AUTH BY		
COMP	NJ	07/05/2021		DWG NO	REVISION	
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.8	0
SCALE	1:200 000					

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Main Recreational Venues

Information regarding main recreational venues within 35 km of the nuclear installation(s) are presented in the subsection below and summarised in ***Table 5.4.4*** (Planning Partners, 2020b).

Their locations are illustrated in ***Drawing 5.4.8***. The numbered codes in ***Table 5.4.4*** correspond with the location of the recreational venue in ***Drawing 5.4.8***.

- Robben Island (15.29 km SSW)

Robben Island is one of South Africa's most well-known landmarks and was proclaimed an UNESCO World Heritage Site in 1999. The island is located 12 km from Cape Town harbour, measures approximately 500 hectares, and houses the world famous Robben Island prison. Public access to the island is only by means of ferries, departing from the Clock Tower precinct in the Victoria & Alfred (V&A) Waterfront. An average of 886 people visit the island per day. A private airstrip is also located on the north-western portion of the island.

- Killarney Motor Club / Race Track (18.48 km SSE)

Killarney Motor Club / Race Track is located in Milnerton. The race track is the base for the Western Province Motor Club. The track has *inter alia* a clubhouse and 100 carting pits. The club is open every day of the week as well as on weekends. Approximately 2 900 club members and visitors are expected on weekends during events. The track has a capacity of approximately 17 000 people.

- Theo Marais Park (20.66 km SSE)

This sports complex is located along Koeberg Road, Milnerton. It accommodates a variety of sports that include cricket, baseball, rugby, hockey, karate, table tennis, volley ball, gym, squash and badminton. The complex serves mainly as a practise venue for school and club sports. Crowd attendances vary between 50 and 500 people, depending on the type of meeting.

- Cape Town Stadium (25.21 km S)

Cape Town Stadium was initially built to accommodate the 2010 Soccer World Cup, which was partly hosted in Cape Town. After the Soccer

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World Cup, the stadium has served as a venue for a variety of sport and recreational activities. This includes soccer, rugby, athletics, community festivals and live music events. The stadium has a capacity of 58 309 people.

- Green Point Athletic Stadium (25.44 km S)

Green Point Athletic Stadium is located adjacent to and to the south of Cape Town Stadium. The facility provides for a variety of sports and athletic events, as well as team building activities, stage concerts and exhibitions. The stadium has a capacity of 4 500 people.

- Artscape Theatre (26.93 km S)

The Artscape Theatre is Cape Town's major venue for year-round theatre and musical shows. The complex is located adjacent to the Cape Town civic centre, on the corner of Hertzog Boulevard and D.F. Malan Street, in the central business district of Cape Town. It contains an opera house, theatre, arena and various multi-functional foyers and function rooms. Artscape has a total combined capacity of 4 516 people.

- GrandWest Casino and Entertainment World (28.83 km SSE)

GrandWest Casino and Entertainment World, located off Vanguard Drive in Goodwood, is an around-the-clock event and entertainment venue encompassing a casino, restaurants, bars, theatre, cinema, ice rink, nightclub, hotel, multi-functional arena and other multi-functional venues. The combined complex has a total capacity of approximately 21 000 people. The Grand Arena has variable capacities depending on the chosen event configuration. As example, the arena has a joint standing and seated capacity of approximately 6 900 people, which configuration is often utilised for live music events.

- Hartleyvale Stadium (29.37 km S)

Hartleyvale Stadium is located in Observatory and offers four astroturf multi-purpose sports fields. The stadium has a seating capacity of 1 700 people.

- Table Mountain (Aerial Cableway) (30.23 km S)

Table Mountain is Cape Town's iconic landmark. Access to the top of the mountain is either by foot on various hiking trails, or by means of the

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Table Mountain aerial cableway. It is noted that in winter months (May, June and July) fewer people make use of the cableway per day compared to the peak summer season (December and January). The aerial cableway transports an average of 3 149 people per day, with a maximum capacity of approximately 6 000 people per day.

- Langa Indoor Sports Centre (31.30 km SSE)

Langa Indoor Sports Centre is located along Bhunga Avenue in Langa. It includes indoor courts, a gym and outdoor courts and fields. The facility has a maximum capacity of 500 people.

- Athlone Stadium (32.60 km SSE)

Athlone Stadium is located along Cross Boulevard in Athlone. It is mainly used for soccer and is capable of hosting local, national and international matches. The stadium has a capacity of approximately 24 250 people.

- Newlands Rugby Stadium (32.75 km S)

Newlands Rugby Stadium is located along Boundary Road in Newlands. The stadium is the base for the Western Province Rugby Football Union and the DHL Stormers and DHL Western Province rugby teams. The stadium also hosts international games and has a seating capacity of 51 900 people. It has been reported that Newlands Rugby Stadium has been sold and the site may be redeveloped in future to make way for residential and retail developments. Should this happen, it has been reported that the Western Province Rugby Football Union and the DHL Stormers and DHL Western Province rugby teams have relocated to Cape Town Stadium. The Newlands Stadium is currently being reconsidered for redevelopment as a mixed use precinct, subject to approval being obtained from the relevant decision making authority.

- Newlands Cricket Ground (33.10 km S)

Newlands Cricket Ground is located along Campground Road in Newlands. The cricket ground is the base of the Western Province Cricket Association and the Cape Cobras team. The stadium hosts domestic and international matches and has a seating capacity of 25 000 people.

- Vygieskraal Stadium (33.58 km SSE)

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Vygieskraal Stadium is located along Johnston Road in Belgravia. It is used mostly for soccer and athletic events. The stadium includes a multi-purpose sport field, athletics track and astroturf. The facility has a maximum capacity of 12 000 people.

- Kirstenbosch Botanical Gardens (34.39 km S)

The world renowned Kirstenbosch Botanical Garden is located approximately 13 km from the Cape Town CBD along Rhodes Drive in Newlands. It covers a total area of approximately 528 ha, with 36 ha thereof being cultivated gardens. The gardens are a celebration of South African flora, showcasing indigenous South African plants. Forest, fynbos, proteas, cycads and rolling lawns are intermingled with streams and ponds. The garden is open 365 days of the year. The garden receives an average of 2 944 people per day.

Table 5.4.4
Main Recreational Venues within 35 km (2020)

Code in Drawing	Name	Distance & Direction	Capacity (persons)	Maximum/day or Average/day or Average/event (persons)
RV1	Robben Island	15.29 km SSW	-	886 average/day
RV2	Killarney Motor Club / Race Track	18.48 km SSE	17 000	2 900 average/event
RV3	Theo Marais Park	20.66 km SSE	-	500 maximum/event
RV4	Cape Town Stadium	25.21 km S	58 309	-
RV5	Green Point Athletic Stadium	25.44 km S	4 500	-
RV6	Artscape Theatre	26.93 km S	4 516	-
RV7	GrandWest Casino & Grand Arena	28.83 km SSE	21 000	-
RV8	Hartleyvale Stadium	29.37 km S	1 700	-
RV9	Table Mountain (Aerial Cableway)	30.23 km S	6 000	3 149 average/day
RV10	Langa Indoor Sports Centre	31.30 km SSE	500	-
RV11	Athlone Stadium	32.60 km SSE	24 224	-
RV12	Newlands Rugby Stadium	32.75 km S	51 900	-

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Code in Drawing	Name	Distance & Direction	Capacity (persons)	Maximum/day or Average/day or Average/event (persons)
RV13	Newlands Cricket Ground	33.10 km S	25 000	-
RV14	Vygieskraal Stadium	33.58 km SSE	12 000	-
RV15	Kirstenbosch Botanical Gardens	34.39 km S	-	2 944 average/day

Main Annual Sport and Concert Events

Information regarding main annual sport and concert events within 35 km of the nuclear installation(s) are presented in the subsection below and summarised in ***Table 5.4.5*** (Planning Partners, 2020b).

Their locations or starting points are illustrated in ***Drawing 5.4.8***. The numbered codes in ***Table 5.4.5*** correspond with the location of the annual sport or concert event in ***Drawing 5.4.8***.

- Cape Town Cycle Tour

The Cape Town Cycle Tour (previously known as the Cape Argus) is an annual cycle race and is the world's biggest timed sporting event. It is traditionally staged on the second Sunday of March. The race starts at the Grand Parade in the Cape Town CBD and follows a circular route around the Cape Peninsula and ends at Cape Town Stadium precinct in Green Point, a distance of approximately 108 km. The event attracts approximately 35 000 participants.

- Two Oceans Marathon

The Two Oceans Marathon is an annual ultramarathon (56 km distance run) and half-marathon (21 km distance run) traditionally staged on the Easter Saturday. Both races start at the corner of Main Road and Dean Street in Newlands. The ultramarathon follows a circular route in a southern direction to Fish Hoek and back north over Ou Kaapse Weg and ends at the University of Cape Town's Rugby Fields, Upper Campus in Rondebosch. The half-marathon follows the M3 highway before turning back into the direction of Kirstenbosch where runners meet up with ultramarathon participants. The ultramarathon race has an entry limit of

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11 000 participants and the half-marathon 16 000 participants.

- Cape Town Marathon

The Cape Town Marathon (42.2 km distance run) is an annual event traditionally held during October. The race starts at the corner of Granger Bay and Beach Road in Green Point and ends at the Cape Town Stadium precinct in Green Point. The race takes runners through the neighbourhoods of Green Point, Sea Point, the City Centre, Woodstock, Newlands and Observatory. The marathon has an entry limit of 15 000 participants.

- World Rugby Sevens Series (Cape Town)

Cape Town Stadium is one of the annual World Rugby Sevens Series' venues. The most recent tournament in Cape Town stretched over three days from 13 December 2019 to 15 December 2019. The total attendance over the three days at the Cape Town Stadium was 119 539 people, with the highest number of people recorded on Sunday, 15 December 2019 at 55 804 people.

- Rocking the Daisies

Rocking the Daisies is an annual outdoor musical and lifestyle festival traditionally held over three days during the first weekend in October. The festival is held at Cloof Wine Estate, just outside the town of Darling. The festival is attended by approximately 25 000 people.

- Ultra South Africa (Cape Town)

Ultra South Africa features a large variety of electronic music performers. The annual outdoor music festival is traditionally held during February at The Ostrich Farm. The festival was attended by approximately 16 830 people on 28 February 2020.

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Table 5.4.5
Main Annual Sport and Concert Events within 35 km (2019/2020)

Code in Drawing	Name	Distance & Direction	Typical Time of Year	Number of Participants or Concertgoers on a Specific Day
SCE1	Ultra South Africa (Cape Town)	13.71 km ESE	February	16 830
SCE2	Rocking the Daisies	23.13 km NNE	1st weekend in October	25 000
SCE3	Cape Town Marathon	25.16 km S	October	15 000
SCE4	World Rugby Sevens Series (Cape Town)	25.21 km S	December	55 804
SCE5	Cape Town Cycle Tour	27.53 km S	2nd Sunday of March	35 000
SCE6	Two Oceans Marathon	32.82 km S	Easter Saturday	27 000

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Beaches

The activities and number of beachgoers per beach or stretch of coastline within 35 km of the nuclear installation(s) at approximately midday on 2 January 2018 are summarised in ***Table 5.4.6*** (Planning Partners, 2020b). The beach or stretch of coastline evaluated is illustrated in ***Drawing 5.4.8***. The numbered codes in ***Table 5.4.6*** correspond with the location of the beach or stretch of coastline in ***Drawing 5.4.8***.

Table 5.4.6
Activities and Number of People per Beach within 35 km (2018)

Code in Drawing	Name of Beach or Stretch of Coastline	Distance & Direction	Walking / Sitting / Standing / Sunbathing	Swimming	Surfing	Other	Total No. of Beachgoers
B1	Van Riebeeckstrand	4.66 km SSE	47	3	2	0	**52**
B2	Melkbosstrand	5.46 km S	833	10	17	0	**860**
B3	Holbaai/Derdesteen /Tweedesteen	8.48 km S	106	0	3	0	**109**
B4	Eerstesteen	10.94 km S	9	0	0	0	**9**
B5	Silwerstroomstrand	12.87 km NW	62	24	0	0	**86**
B6	Bokbaai	15.28 km NW	2	0	0	0	**2**
B7	Bloubergstrand	17.94 km SSE	1 319	5	43	0	**1 367**
B8	Table View	19.24 km SSE	44	0	0	0	**44**
B9	Sunset Beach	20.47 km SSE	5	0	0	0	**5**
B10	Ganzekraal	20.58 km NNW	31	0	0	0	**31**
B11	Woodbridge Island	23.85 km SSE	522	72	0	0	**594**
B12	Green Point Promenade	24.84 km S	37	0	0	0	**37**
B13	Lagoon Beach	24.92 km S	0	0	0	0	**0**
B14	Sea Point Promenade	26.05 km S	1 747	363	0	0	**2 110**
B15	Grotto Bay	28.05 km NNW	11	0	0	0	**11**
B16	Clifton (First to Forth Beach)	29.08 km S	839	33	3	0	**875**
B17	Camps Bay	30.73 km S	1 433	99	14	0	**1 546**
B18	Jakkalsfontein	34.17 km NNW	0	0	0	0	**0**

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Code in Drawing	Name of Beach or Stretch of Coastline	Distance & Direction	Walking / Sitting / Standing / Sunbathing	Swimming	Surfing	Other	Total No. of Beachgoers
		Total	**7 047**	**609**	**82**	**0**	**7 738**

As the weather conditions on 2 January 2018 were not ideal for outdoor activities, i.e. overcast and moderate to cool, with a light to moderate wind, the results of the previous coastal survey conducted on 26 December 2010 (Eskom, 2022a) is presented in ***Table 5.4.7*** for comparison. The weather conditions during the 2010 survey were more suited for outdoor activities, i.e. sunny and hot with a light to moderate wind.

Table 5.4.7
Comparison between the Number of Beachgoers in 2010 and 2018 within 35 km

Code in Drawing	Name of Beach or Stretch of Coastline	Distance & Direction	Number of Beachgoers Midday in Peak Holiday Season (2010)	Number of Beachgoers Midday in Peak Holiday Season (2018)
B1	Van Riebeeckstrand	4.66 km SSE	320	52
B2	Melkbosstrand	5.46 km S	2 481	860
B3	Holbaai/Derdesteen/Tweedesteen	8.48 km S	680	109
B4	Eerstesteen	10.94 km S	475	9
B5	Silwerstroomstrand	12.87 km NW	773	86
B6	Bokbaai	15.28 km NW	231	2
B7	Bloubergstrand	17.94 km SSE	2 296	1 367
B8	Table View	19.24 km SSE	1 921	44
B9	Sunset Beach	20.47 km SSE	107	5
B10	Ganzekraal	20.58 km NNW	8	31
B11	Woodbridge Island	23.85 km SSE	1 273	594
B12	Green Point Promenade	24.84 km S	262	37
B13	Lagoon Beach	24.92 km S	685	0
B14	Sea Point Promenade	26.05 km S	5 118	2 110

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Code in Drawing	Name of Beach or Stretch of Coastline	Distance & Direction	Number of Beachgoers Midday in Peak Holiday Season (2010)	Number of Beachgoers Midday in Peak Holiday Season (2018)
B15	Grotto Bay	28.05 km NNW	111	11
B16	Clifton (First to Forth Beach)	29.08 km S	2 213	875
B17	Camps Bay	30.73 km S	10 024	1 546
B18	Jakkalsfontein	34.17 km NNW	10	0
		Total	**28 988**	**7 738**

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5.4.6.2 Main Shopping Centres

Data on the latest available foot counts for main shopping centres were obtained from the South African Council for Shopping Centres and e-mail and telephonic surveys for main shopping centres within 35 km of the nuclear installation(s). Shopping centres with a Gross Leasable Area (GLA) of 10 000 m² or more have been included (Planning Partners, 2020b).

The data regarding main shopping centres are presented in ***Table 5.4.8***. Their locations are illustrated in ***Drawing 5.4.8***. The numbered codes in ***Table 5.4.8*** correspond with the location of the shopping centres in ***Drawing 5.4.8***.

It should be noted that not all of the shopping centres conduct regular foot counts or conduct foot counts at all. Where foot count information was not available, the number of people was estimated based on the GLA of a specific shopping centre compared to the available data from shopping centres of a similar extent. Based on the available foot count information, the following average factors were applied:

- large malls – 0.2 people per m² GLA;
- medium sized malls – 0.49 people per m² GLA;
- smaller malls – 0.68 people per m² GLA.

Table 5.4.8
Main Shopping Centres within 35 km (2020)

Code in Drawing	Name	GLA in m²	Distance & Direction	Average Number of Visitors per Day	Number of Visitors per Day during Peak Season (December and January)
SC1	Table Bay Mall	67 329	12.88 km SSE	33 000	-
SC2	Atlantis City	22 112	13.83 km NNE	25 806	-
SC3	The Emporium	12 243	14.99 km SSE	8 325*	-
SC4	West Coast Village	16 500	15.01 km SSE	11 220*	-

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Code in Drawing	Name	GLA in m²	Distance & Direction	Average Number of Visitors per Day	Number of Visitors per Day during Peak Season (December and January)
SC5	Sandown Retail	26 816	15.04 km SSE	13 140*	-
SC6	Bayside Mall	45 459	16.91 km SSE	20 042	30 210
SC7	Table View Mall	10 412	17.34 km SSE	7 080*	-
SC8	Makro - Montague Gardens	10 305	20.71 km SSE	7 007*	-
SC9	Sable Square	27 082	23.90 km SSE	13 270*	-
SC10	Canal Walk	146 828	25.13 km SSE	58 052	-
SC11	V&A Waterfront	69 000	25.78 km S	63 013	-
SC12	N1 City Mall	64 209	26.59 km SSE	26 968*	-
SC13	Golden Acre	33 590	27.34 km S	100 560	-
SC14	Goodwood Mall	13 408	28.29 km SSE	9 117*	-
SC15	Willowbridge Centre	42 164	28.30 km SE	8 857	10 260
SC16	Gardens Centre	14 539	28.56 km S	10 050	-
SC17	Tyger Valley Centre	88 978	28.71 km SE	34 980	-
SC18	Cobble Walk	12 798	29.39 km SE	8 703*	-
SC19	Howard Centre	14 779	29.41 km SSE	9 881	-
SC20	Parow Centre	85 082	29.79 km SSE	29 256	29 535
SC21	Glengarry Village	10 548	29.86 km SE	7 173*	-
SC22	Makro - Cape Gate	10 305	30.85 km SE	7 007*	-
SC23	Middestad Mall	19 953	31.17 km	29 510	31 194

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Code in Drawing	Name	GLA in m²	Distance & Direction	Average Number of Visitors per Day	Number of Visitors per Day during Peak Season (December and January)
			SE		
SC24	Cape Gate Regional Centre	63 700	31.31 km SE	29 325	-
SC25	Brackenfell Shopping Centre	34 492	32.44 km SE	16 901*	-
SC26	Vangate Mall	28 000	33.08 km SSE	27 733	30 018
SC27	Cavendish Square	44 993	33.88 km S	38 356	-
SC28	Access Park Kuils River	15 000	34.06 km SE	-	6 564
SC29	Kenilworth Centre	48 941	34.94 km S	27 988	37 000

* Estimated number based on the GLA of the shopping centre compared to shopping centres of a similar extent.

5.4.6.3 Main Conference Facilities

Information regarding main conference facilities within 35 km of the nuclear installation(s) were obtained from a desktop study (Planning Partners, 2020b). Conference facilities with a capacity of 500 people or more have been included.

The information regarding main conference facilities are presented in ***Table 5.4.9*** below. Their locations are illustrated in ***Drawing 5.4.8***. The numbered codes in ***Table 5.4.9*** correspond to the location of the conference facilities in ***Drawing 5.4.8***.

Conference facilities often have varying capacities depending on the configuration of the facilities and the type of conference or event (e.g. banquet, cocktail, cinema style, u-shape style, classroom style, boardroom, etc.). ***Table 5.4.9*** presents the total maximum capacity of the conference facilities, which often represents a cocktail or cinema style event together with all other facility capacities at the specific venue.

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Table 5.4.9
Main Conference Facilities within 35 km (2020)

Code in Drawing	Name	Distance & Direction	Total Maximum Capacity
CF1	Lagoon Beach Conference Centre	24.35 km SSE	600
CF2	The Table Bay	25.09 km S	630
CF3	Century City Conference Centre	25.22 km SSE	1 900
CF4	UCT GSB Academic Conference Centre	25.59 km S	585
CF5	Protea Hotel Waterfront Breakwater Lodge	25.66 km S	843
CF6	Two Oceans Aquarium Conference Centre	25.67 km S	1 000
CF7	Life Conference Centre	25.94 km S	776
CF8	Cape Town International Conference Centre	26.54 km S	26 801
CF9	Southern Sun Cape Sun	27.15 km S	1 040
CF10	Mount Nelson	28.35 km S	999
CF11	Garden Court Nelson Mandela Boulevard	28.62 km S	650
CF12	The River Club	28.79 km S	982
CF13	GrandWest Conference Venues	28.99 km SSE	3 000
CF14	The Bay Hotel	30.98 km S	770
CF15	CAB Conference Centre	32.38 km SE	550

5.4.6.4 Tourist Population

EDGE Tourism Solutions undertook a study to estimate the total tourist population during 2018 on any single day during the peak season within the site region (Planning Partners, 2021a). This study includes the determination of the tourist population for the following:

- the domestic tourist population;
- the international tourist population;
- the total tourist population.

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Data Sourced and Methodology

Due to the outbreak of the worldwide COVID-19[5] pandemic and subsequent national government regulations pertaining to restrictions on the movement of people and restrictions on the interaction between people, the methodology for determining the tourist population (EDGE Tourism Solutions, 2017) could not be followed.

The 2017 methodology applies a three pronged research approach namely: (i) a sample survey with accommodation providers, (ii) a census survey with all key attraction providers in the catchment areas, and (iii) qualitative in-depth interviews with key role players in the tourism industry verifying the results obtained. Primary research would have been required to determine the current maximum tourist population that could be accommodated in formal accommodation establishments, the current average tourist population that is accommodated in formal accommodation establishments and the distribution of these populations in relation to the nuclear installation(s). The outcome of this methodology was directed at achieving a weighted tourism distribution within the site region.

Given that the abovementioned 2017 methodology could not be followed, an alternative methodology compiled by EDGE Tourism Solutions (EDGE Tourism Solutions, 2020) had to be implemented during 2020 and 2021. The alternative methodology applied in this study does not achieve the same degree of accuracy of the weighted tourism distribution method. Should circumstances permit, the 2017 methodology should be implemented during the next update of the DSSR.

As COVID-19 started disrupting travel in late 2019, tourism data form 2018 provides the most recent credible tourism data for a full year that has not been impacted by exceptional circumstances presented by COVID-19. At the time of writing, it is not possible to state when tourism figures will recover to 2018 levels.

Data relating to the tourist population for both domestic and international tourism were sourced through a three phased qualitative Delphi-technique study.

First, data sourced from South African Tourism, Statistics South Africa

[5] Coronavirus disease (COVID-19)

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and WESGRO were summarised in a benchmark report. This summative report served as the initial benchmark for phase two. The second phase entailed three consecutive rounds of interviews with experts to:

- verify the accuracy and truthfulness of data in the initial benchmark summative report;
- recommend adjustments to the tourism figures where applicable;
- obtain expert opinion regarding the regional distribution of tourism in the Western Cape Province;
- obtain expert opinion regarding cyclical patterns for both domestic and international inbound visitors for each tourism district (i.e. City of Cape Town and Cape Winelands, Overberg and West Coast district municipalities) and the Western Cape Province.

The results of the consecutive rounds of interviews were incorporated into a revised summative report. Note that expert opinion did not converge to single figures for all indicators. Ranges provided in the summative report reflect variation in expert opinion. In the summative report, estimates of all tourism figures are reported in data ranges, i.e. lower and upper seasonal estimates. The final summative report was then validated though interviews with experts within each of the tourism districts in question to produce a final summative report (i.e. the third phase). For the purposes of updating the DSSR Chapter 5.4: Demography, the upper seasonal estimates are reflected below and utilised or applied where required.

The calculations of the tourist population of the Western Cape Province are based on domestic and international tourism trip[6] data published by

[6] A trip taken by a visitor is a "*tourism trip"* and a trip refers to the travel by a person from the time of departure from his/her usual residence until he/she returns. A trip is made up of visits to different places. The term *"tourism visit"* refers to a stay in a place visited during a tourism trip. A *"visitor"* is a traveller taking a trip to a main destination outside his/her usual environment, for less than a year, for any main purpose (business, leisure or other personal purpose) other than to be employed by a resident entity in the country or place visited. A visitor (domestic, inbound or outbound) is classified as a *"tourist"* (or overnight visitor) if his/her trip includes an overnight stay, or as a *"same-day visitor"* (or excursionist) otherwise (United Nations and World Tourism Organization, 2010).

Observing tourism trips and visits is different from observing visitors, as an individual might make more than one trip or visit during the period of observation. Therefore, the number of visitors to a

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South African Tourism and expert opinion of provincial penetration rates. Expert opinion was obtained during 2020 through primary research among tourism specialists. The geographic distribution of tourism trips (also known as penetration rates) within the province for the four tourism districts that fall within the 80 km radius around the nuclear installation(s), i.e. City of Cape Town and Cape Winelands, Overberg and West Coast district municipalities, district market profiles (domestic versus international split) and average length of stay in each district are also based on expert opinion through consensus.

Domestic and International Tourism Trips

It is estimated that the Western Cape Province received 2 718 769 domestic tourism trips during 2018. Additionally, it is estimated that the Western Cape Province received 1 727 897 international tourism trips during 2018. The total number of tourism trips to the Western Cape Province during 2018 is therefore estimated as 4 446 666.

The total share of all tourism trips across the four districts (as percentage of the provincial total) at any point in time (or the penetration rate) is calculated as 60 per cent for City of Cape Town, 7 per cent for Overberg, 8 per cent for West Coast and 18 per cent for the Winelands district. The remaining 7 per cent of tourism trips are distributed across the other tourism districts of Garden Route, Klein Karoo and Greater Karoo. These penetration rates were used to calculate the total number of tourism trips to each district.

In 2018, City of Cape Town received an estimated 2 668 000 tourism trips, Cape Winelands 800 400 tourism trips, Overberg 311 267 tourism trips and West Coast 355 733 tourism trips. The four districts collectively received an estimated 4 135 399 tourism trips.

The tourism market profiles (domestic versus international expressed in percentage) for the districts were indicated to be: City of Cape Town 65 versus 35 per cent; Cape Winelands 65 to 77 per cent versus 18 to 35 per cent; Overberg 65 to 82 per cent versus 18 to 35 per cent; and West Coast 77 per cent versus 23 per cent. These percentages were used to calculate or allocate the number of domestic and international

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place is likely to be less than the number of trips received during a given period. From the above, “tourism visit” would be the more accurate term for the activity of visitors travelling to the site region. However, to maintain consistency with the terminology used by SA Tourism, EDGE Tourism Solutions has opted to use the term “tourism trip” instead of “tourism visit”.

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tourism trips to the districts.

In 2018, City of Cape Town received an estimated 1 734 200 domestic tourism trips, Cape Winelands 616 308 domestic tourism trips, Overberg 255 239 domestic tourism trips and West Coast 274 982 domestic tourism trips. The four districts collectively received an estimated 2 880 728 domestic tourism trips during 2018.

Additionally, City of Cape Town received an estimated 933 800 international tourism trips, Cape Winelands 280 140 international tourism trips, Overberg 108 943 international tourism trips and West Coast 80 751 international tourism trips during 2018. The four districts collectively received an estimated 1 403 635 international tourism trips during 2018.

Tourist Population during the Peak Period

Assumptions

The peak period for domestic tourism to the Western Cape Province coincides with the summer and autumn school holidays, i.e. December, January, and March/April. The international tourism seasonal peak months are November to March.

To arrive at the number of domestic, international and total tourists at any one day in the peak tourism period, the following assumptions have been made:

- the peak period for domestic trips comprises 14 weeks in December, January and March. The peak month is December;
- the peak period for international tourism trips comprises 18 weeks from December to March. The peak month is January;
- the peak period for all tourism trips comprises 18 weeks from December to March. The number of days in the peak period is 121. The peak month is December;
- the percentage of district domestic tourism trips received during the peak period was as follows: City of Cape Town 51 to 85 per cent, Cape Winelands 51 to 80 per cent, Overberg 55 to 65 per cent and West Coast 59 per cent;
- the percentage of international tourism trips received by each district during the peak period was as follows: City of Cape Town

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62 to 81 per cent, Cape Winelands 59 to 79 per cent, Overberg 54 per cent and West Coast 48 per cent;

- the average durations (length of stay) of domestic tourism trips during the peak period were as follows: City of Cape Town 5 to 7 nights, Cape Winelands 3.5 nights, Overberg 2 nights and West Coast 3.5 nights;
- the average durations (length of stay) of international trips during the peak period were as follows: City of Cape Town 8 nights, Cape Winelands 4 to 5 nights, Overberg 3 to 4 nights and West Coast 3.5 nights.

Domestic Tourist Population

The following calculations were made to calculate the total domestic tourist population in the four districts (as a sum of the respective domestic tourist populations in each district) on any one day over the peak tourism period:

Domestic tourist population (upper estimate) = $$\sum_{i=1}^{4}[(\boldsymbol{Wn.Pi})(\boldsymbol{Ds})(\boldsymbol{Pp})(\boldsymbol{Dd})]/\boldsymbol{Dp}$$

Where:

Wn = provincial total trips
Pi = area penetration
Ds = district domestic market share
Pp = percentage trips received in peak period
Dd = average length of stay
Dp = no of days in peak period

And 4 = the number of districts in the study area

In more detail one has:

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City of Cape Town: *[(4 446 666 × 0.60) × 0.65 × 0.85 × 7] ÷121*

= 10 318 488 ÷ 121

= 85 277

Cape Winelands: *[(4 446 666 × 0.18) × 0.77 × 0.80 × 3.5] ÷121*

= 1 725 662 ÷ 121

= 14 262

Overberg: *[(4 446 666 × 0.07) × 0.82 × 0.65 × 2] ÷ 121*

= 331 810 ÷ 121

= 2 742

West Coast: *[(4 446 666 × 0.08) × 0.773 × 0.59 × 3.5] ÷ 121*

= 567 837 ÷ 121

= 4 693

Total: = *85 277 + 14 262 + 2 742 + 4 693*

= ***106 974***

Based on the assumptions regarding percentage of trips received during the peak period and average duration of trips during the peak period, one arrives at 10 318 488 domestic visitor days for City of Cape Town, 1 725 662 for Cape Winelands, 331 810 for Overberg and 567 837 for West Coast. The peak tourism season is 121 days. When the total number of visitor days over the peak period is divided by the number of days in the peak tourism season, the number of visitors per day is obtained.

Therefore, on any one day in the peak tourism period during 2018, there was an estimated 85 277 domestic visitors in City of Cape Town, 14 262 in Cape Winelands, 2 742 in Overberg and 4 693 in West Coast. Thus, on any one day in the peak tourism season, there was an estimated

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106 974 domestic visitors in the four districts collectively.

International Tourist Population

The following calculations were made to calculate the total international visitor population in the four districts (as a sum of the respective international tourist populations in each district) on any one day over the peak tourism period:

International tourist population (upper estimate) = $\sum_{i=1}^{4}[(Wn.Pi)(Is)(Pp)(Dd)]/Dp$

Where:

Wn = provincial total trips (UE)
Pi = area penetration (UE)
Is = international market share (UE)
Pp = percentage trips received in peak period (UE)
Dd = average length of stay (UE)
Dp = no of days in peak period

And 4 = the number of districts in the study area

In more detail one has:

City of Cape Town: *[(4 446 666 × 0.60) × 0.35 × 0.81 × 8] ÷ 121*

= 6,051,023 ÷ 121

= 50 008

Cape Winelands: *[(4 446 666 × 0.18) × 0.35 × 0.79 × 5] ÷ 121*

= 1,106.553 ÷ 121

= 9 145

Overberg: *[(4 446 666 × 0.07) × 0.35 × 0.54 × 4] ÷ 121*

= 235,318 ÷ 121

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$= 1\ 945$

West Coast: $[(4\ 446\ 666 \times 0.08) \times 0.227 \times 0.48 \times 3.5] \div 121$

$= 135{,}662 \div 121$

$= 1\ 121$

Total: $= 50\ 008 + 9\ 145 + 1\ 945 + 1\ 121$

$= \mathbf{62\ 219}$

Based on the assumptions regarding the percentage of trips received during the peak period and average duration of trips during the peak period, one arrives at 6 051 023 international visitor days for City of Cape Town, 1 106 553 for Cape Winelands, 235 318 for Overberg and 135 662 for West Coast. The peak tourism season is 121 days. When the total number of visitor days over the peak period is divided by the number of days in the peak tourism season, the number of visitors per day is obtained.

Therefore, on any one day in the peak tourism period, there will be an estimated 50 008 international visitors in City of Cape Town, 9 145 in Cape Winelands, 1 945 in Overberg and 1 121 in West Coast. Thus, on any one day in the peak tourism season, there will be an estimated 62 219 international visitors in the four districts collectively.

Total Tourist Population

From the above, it is estimated that a total of 135 285 visitors are present in City of Cape Town on any one day in the peak tourism season, 23 407 in Cape Winelands, 4 687 in Overberg and 5 814 in West Coast. Thus, on any one day in the peak tourism season, there will be an estimated 169 193 visitors in the four districts collectively.

Tourist Population on Any Day during the Peak Month

As the higher share of all trips during the peak month (i.e. December) relative to other months would logically affect the upper estimate of the number of visitors present in each district, the number of visitors in the peak month was also calculated.

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The percentage of domestic tourism trips received by each district during the peak month was as follows: City of Cape Town 14 to 35 per cent, Cape Winelands 14 to 35 per cent, Overberg 20 to 22 per cent and West Coast 19 per cent. The percentage of international tourism trips received by each district during the peak month was as follows: City of Cape Town 17 to 20 per cent, Cape Winelands 17 to 20 per cent, Overberg 15 per cent and West Coast 17 per cent.

Based on the assumptions regarding the percentage of trips received during the peak month, one arrives at a total (domestic and international) of 5 742 869 visitor days for City of Cape Town, 1 035 117 for Cape Winelands, 486 074 for Overberg and 230 910 for West Coast. The peak month is 31 days. When the total number of visitor days over the peak month is divided by the number of days in the peak month, the number of visitors per day is obtained.

Therefore, it is estimated that a total of 185 254 visitors are present in City of Cape Town on any one day in the peak month, 33 391 in Cape Winelands, 15 680 in Overberg and 7 449 in the West Coast. Thus, on any one day in the peak month, there will be an estimated 241 774 visitors in the four districts collectively.

A summary of the upper seasonal estimated variables, based on the results of the Delphi-technique study (Planning Partners, 2021a), is presented in ***Table 5.4.10*** below.

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Table 5.4.10
Upper Seasonal Estimated Input Variables for Calculation of Tourist Population based on Results of the Delphi Study, and Associated Outputs (2018)

Variable	Geographic Area				Total
	Cape Town	Cape Winelands	Overberg	West Coast	
Annual tourist numbers					
a. District market share (penetration rate) of district of all provincial tourism trips (*Pi*)	60 per cent	18 per cent	7 per cent	8 per cent	
Annual tourism trips	*2 668 000*	*800 400*	*311 267*	*355 733*	*4 446 666*
b. Domestic tourism market share (*Ds*)	65 per cent	77 per cent	82 per cent	77.3 per cent	
Annual domestic tourism trips	*1 734 200*	*616 308*	*255 239*	*274 982*	*2 880 728*
c. International tourism market share (*Is*)	35 per cent	35 per cent	35 per cent	22.7 per cent	
Annual international tourism trips	*933 800*	*280 140*	*108 943*	*80 751*	*1 403 635*
Peak period (121 days - *Dp*) tourist numbers					
d. Percentage of domestic tourism trips received by district in peak period (*Pp*)	85 per cent	80 per cent	65 per cent	59 per cent	
e. Average length of stay (nights) - domestic trips: peak period (*Dd*)	7	3.5	2	3.5	
Domestic visitor days during peak period	*10 318 488*	*1 725 662*	*331 810*	*567 837*	*12 943 797*
Average domestic visitors per day during peak period (A)	*85 277*	*14 262*	*2 742*	*4 693*	*106 974*
f. Percentage of international tourism trips received by district in peak period (*Pp*)	81 per cent	79 per cent	54 per cent	48 per cent	
g. Average length of stay (nights) - international trips: peak period (*Dd*)	8	5	4	3.5	
International visitor days during peak period	*6 051 023*	*1 106 553*	*235 318*	*135 662*	*7 528 556*
Average international visitors per day during	*50 008*	*9 145*	*1 945*	*1 121*	*62 219*

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Variable	Geographic Area				Total
	Cape Town	Cape Winelands	Overberg	West Coast	
peak period (B)					
***Average total visitors per day during peak period* (A+B)**	***135 285***	***23 407***	***4 687***	***5 814***	***169 193***
Peak month (31 days) tourist numbers					
h. Percentage of domestic tourism trips received in peak month	35 per cent	35 per cent	22 per cent	19 per cent	
i. Percentage of international tourism trips received in peak month	20 per cent	20 per cent	15 per cent	17 per cent	
Total visitor days during peak month	*5 742 869*	*1 035 117*	*486 074*	*230 910*	*7 494 970*
Average total visitors per day during peak month	***185 254***	***33 391***	***15 680***	***7 449***	***241 774***

A part of the geographical area of the three district municipalities falls outside of the 80 km radius. To calculate the tourist population within the 80 km radius, a geographical area calculation was done on the district boundaries to arrive at a percentage of the total geographical area of each of the districts. An ArcMap process was then run to collate this dataset within the 80 km radius. The percentages are shown in ***Table 5.4.11*** below.

Table 5.4.11
Tourist Population within the 80 km Radius (2018)

City of Cape Town (CoCT) and District Municipalities (DM)	% Area within 80 km Radius	Tourist Population Upper Estimate	Tourist Population in 80 km Radius Upper Estimate
CoCT	100	185 254	185 254
Cape Winelands DM	14	33 391	4 675
Overberg DM	4	15 680	627
West Coast DM	16	7 449	1 192
		Total	**191 748**

To calculate the tourist population within the 80 km radius, the

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percentages arrived at in the above calculation was used as follows:

Tourist population within 80km radius = Sum of total tourist population per DM × percentage (area)

The total number of tourists within the 80 km radius for any one day in the peak month during 2018 is estimated at 191 748.

As the tourism figures were not available per local municipality, Enumerated Areas, Small Areas or Sub-places, the total tourist population has been distributed as a ratio of the permanent population within each of the sectors around the nuclear installation(s) as follows:

(total tourist population × 2018 permanent population per sector) ÷ 2018 permanent population

The resultant tourist population ratios per the permanent population for each portion of the tourism districts within the 80 km radius are presented in ***Table 5.4.12***. The tourist population distribution for 2018 for any one day in the peak month within 80 km from the nuclear installation(s) is presented in ***Appendix 5.4.N*** and ***Drawings 5.4.9*** and ***5.4.10*** below.

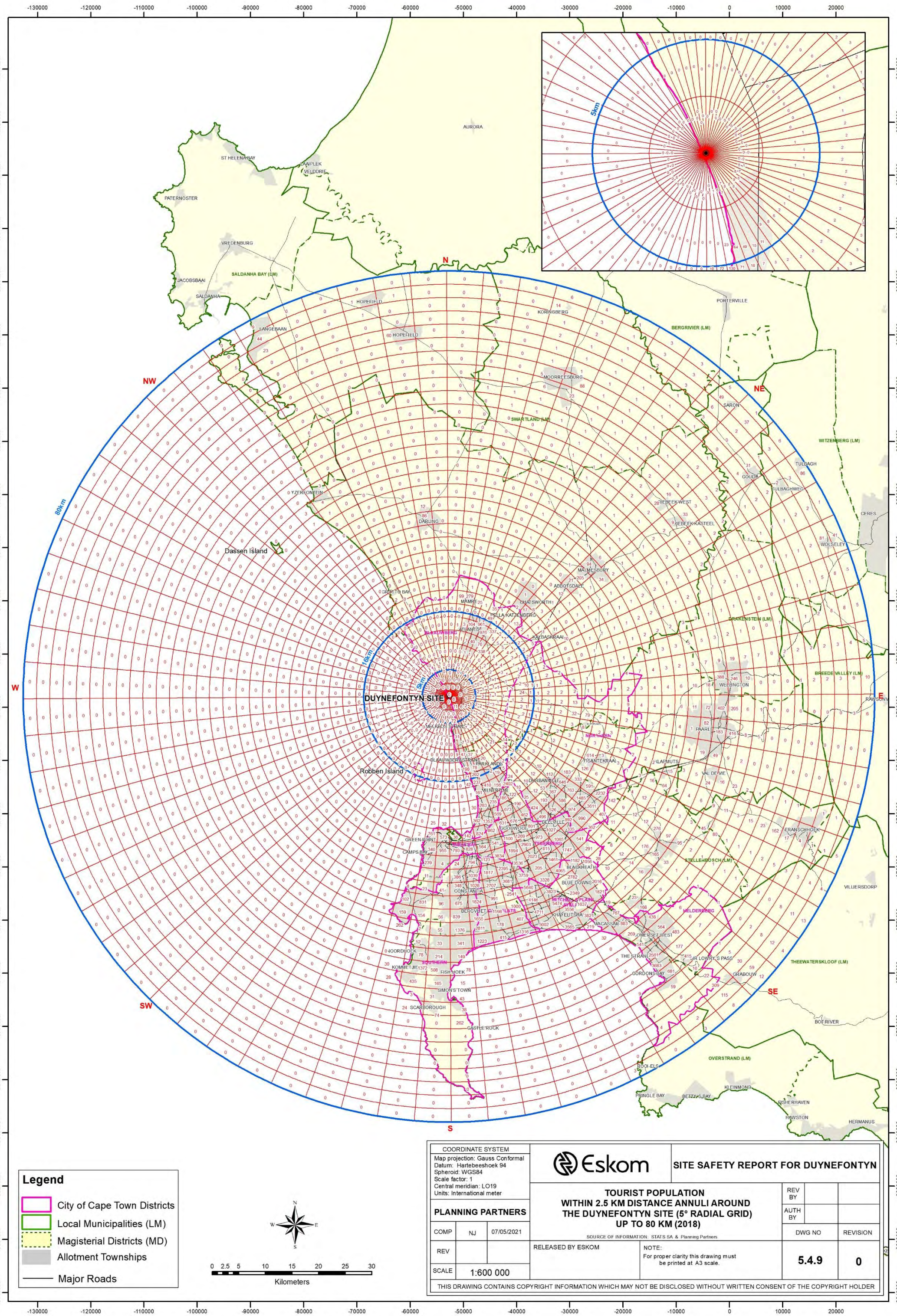
Table 5.4.12
Tourist Population Ratios per Permanent Population

City of Cape Town (CoCT) and District Municipalities (DM)	Tourist Population Ratio per Permanent Population
CoCT	0.04252062808
Cape Winelands DM	0.00847532908
Overberg DM	0.01344281977
West Coast DM	0.0068905717

It could however, be expected that certain sectors would have a larger tourist concentration on any given day, as they contain tourism destinations/nodes (e.g. V&A Waterfront, Table Mountain, Cape Point, etc.) and that other sectors (e.g. resident population's residential areas) would have a lower tourist concentration at any one time. Many destinations are also weather dependant, which would impact on visitor numbers on a daily basis (e.g. beaches, Table Mountain, etc.).

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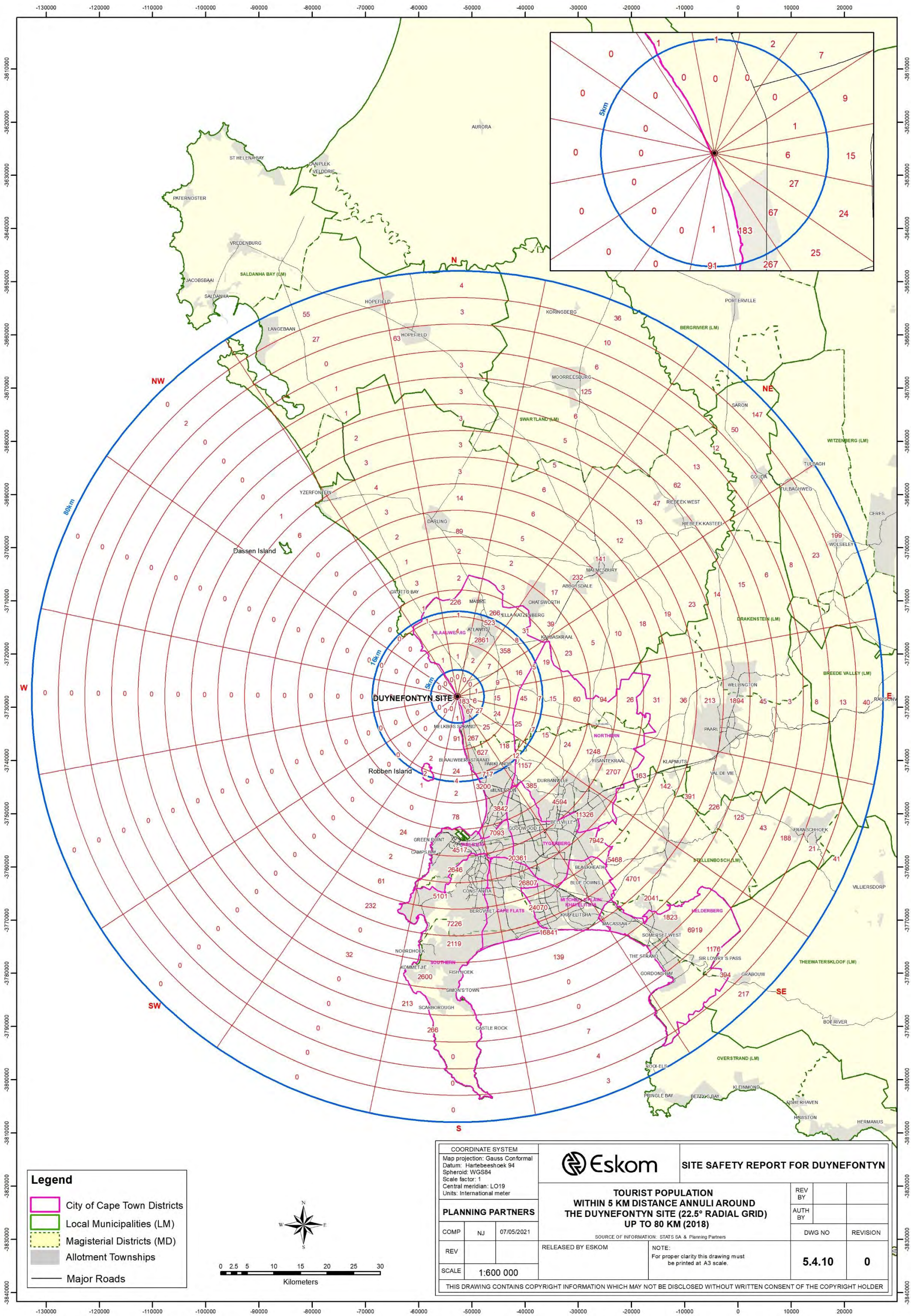


Legend

- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships
- Major Roads

COORDINATE SYSTEM			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			TOURIST POPULATION WITHIN 2.5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (5° RADIAL GRID) UP TO 80 KM (2018) SOURCE OF INFORMATION: STATS SA & Planning Partners	REV BY		
PLANNING PARTNERS				AUTH BY		
COMP	NJ	07/05/2021		DWG NO		REVISION
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.9	0
SCALE	1:600 000					

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COORDINATE SYSTEM		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter		
PLANNING PARTNERS		
COMP	NJ	07/05/2021
REV		
SCALE	1:600 000	

Eskom

SITE SAFETY REPORT FOR DUYNEFONTYN

TOURIST POPULATION WITHIN 5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (22.5° RADIAL GRID) UP TO 80 KM (2018)

SOURCE OF INFORMATION: STATS SA & Planning Partners

REV BY		
AUTH BY		
DWG NO		REVISION
RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.10	0

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Legend

- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships
- Major Roads

0 2.5 5 10 15 20 25 30
Kilometers

5.4.7 Special Population Groups

The Technical Specification for Site Safety Reports: Demography (Eskom, 2014) (Eskom, 2022b) requires the DSSR Chapter 5.4: Demography to report on special population groups within a radius of 35 km from the nuclear installation(s). This distance satisfies the distance prescription in the Technical Specification for Site Safety Reports: Demography that requires information about special population groups to be collected for up to 20 miles. To this end, data regarding special population groups were collected and analysed (Planning Partners, 2020c).

Special population groups are those members of the public who are difficult to evacuate or shelter. To this end, this report focuses on the residents of the following:

- homes for the aged;
- homes for the disabled;
- children's homes;
- prisons;
- hospitals and clinics;
- educational facilities (i.e. universities, schools and day-care facilities/ early childhood development centres);
- seasonal workers;
- informal settlements.

The study area for hospitals, universities and schools has been enlarged to the 80 km radius from the nuclear installation(s) as they represent key infrastructure items that may also support emergency planning.

5.4.7.1 Homes for the Aged

The distribution, location and number of residents of homes for the aged are presented in ***Table 5.4.13*** below and graphically illustrated in ***Drawing 5.4.11*** (Planning Partners, 2020c). Note that some homes for the aged were unwilling to disclose resident figures. In these cases, the

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existing database presented in the DSSR Section 5.4, Rev 0 (Eskom, 2022a) was consulted as the capacity of these homes generally remains constant.

Table 5.4.13
Homes for the Aged within 35 km (2020)

Code in Drawing	Name of Home	Number of Residents	Cumulative Residents	Direction	Distance (km)
HA1	Communicare: Kent Durr	180	180	SSE	22.8
HA2	Huis Zonnekus	98	278	SSE	24.5
HA3	Huis Ebersohn	32	310	SSE	24.9
HA4	Meerenbosch Retirement Village	0*	310	SE	25.0
HA5	CPOA: Sea Point Place	191	501	S	25.7
HA6	SAAHA: G&A Stark	156	657	SE	25.8
HA7	SABC	0*	657	S	26.1
HA8	Huis Aristea	130	787	SE	26.1
HA9	Communicare: Rosehaven	65	852	SE	26.1
HA10	Utilitas: Bellville	21	873	SE	26.3
HA11	Utilitas: Huis Andre van der Walt	360	1 233	SE	26.3
HA12	Utilitas: De Rust Retirement	120	1 353	SE	26.3
HA13	Goodwood Jubileum Gedenkt/ Protea Tehuis	114	1 467	SSE	26.6
HA14	ACVV: Huis Ysterplaat	46*	1 513	S	26.7
HA15	Kensington Home for the Aged	110	1 623	SSE	26.7
HA16	St. Monica's Home	0*	1 623	S	27.4
HA17	Kovacs Inv. 437 Pty Ltd	0*	1 623	SE	27.5
HA18	Uitsig Huis vir Bejaardes	178*	1 801	SSE	27.6
HA19	Haven Night Shelter Utility Company	94	1 895	S	27.9
HA20	ACVV: Zonnebloem Old	106	2 001	S	27.9

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Code in Drawing	Name of Home	Number of Residents	Cumulative Residents	Direction	Distance (km)
	Age Home				
HA21	Rogelim & Monte Rosa Welfare Organisation	111	2 112	S	28.2
HA22	Ladies Christian Home for the Aged	94	2 206	S	28.2
HA23	NG Kerk in Suid Afrika	0*	2 206	SE	28.2
HA24	Goeie Hoop Behuising Maatskappy: Hernus Kriel	55	2 261	SSE	28.7
HA25	Kendrick House	61	2 322	SSE	28.7
HA26	IDAS	0*	2 322	S	28.8
HA27	Communicare: Riverside	65	2 387	SSE	28.8
HA28	Communicare: Berghof	65	2 452	S	28.9
HA29	St. Johannes Heim	90	2 542	SE	28.9
HA30	Nazareth House	116	2 658	S	28.9
HA31	Clareinch Home (Clareinch War Memorial Home)	40	2 698	SSE	29.4
HA32	ACVV: Edelweiss	134	2 832	SE	29.4
HA33	Church of Nazareth Retirement Village	117	2 949	SSE	29.5
HA34	Riverside Manor	105*	3 054	SSE	29.5
HA35	Brown & Annie Lawrence Old Age Home	125	3 179	SSE	29.6
HA36	South African Woman Auxiliary Service	45	3 224	SSE	29.7
HA37	CPOA: Pinelands Place	157	3 381	SSE	29.7
HA38	Pinewood Trust	241	3 622	SSE	30.1
HA39	Helen Keller Society	113	3 735	SSE	30.3
HA40	Meath Street Bellville Investments	0*	3 735	SE	30.6
HA41	ACVV: Ons Tuiste	93	3 828	SE	30.9
HA42	Kleinbron Mews	0*	3 828	SE	31.1
HA43	Redelinghuys	18	3 846	SE	31.2

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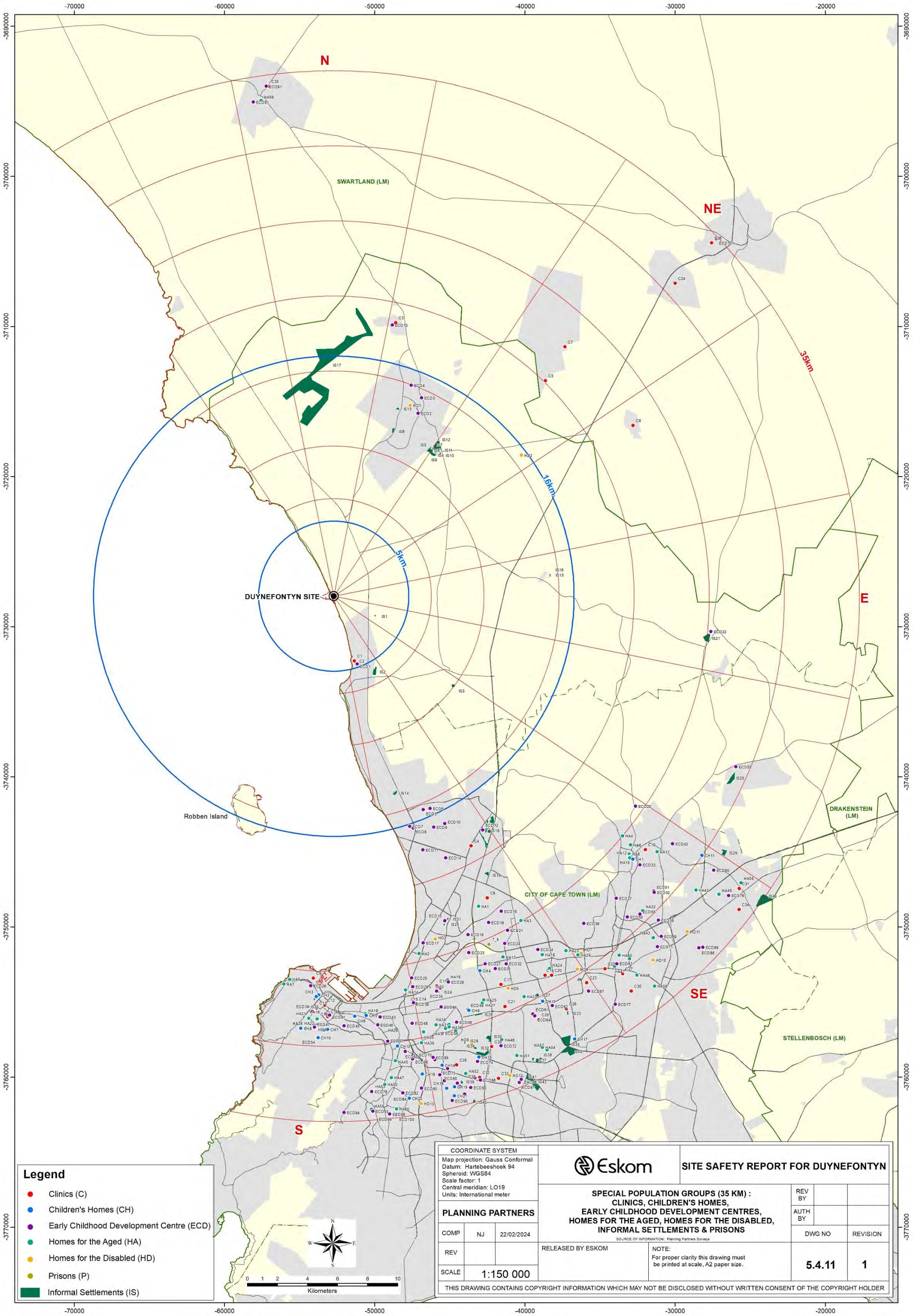
Code in Drawing	Name of Home	Number of Residents	Cumulative Residents	Direction	Distance (km)
HA44	Huis Boland	38	3 884	SE	31.2
HA45	Rosedale Complex SA Legion	0*	3 884	S	31.2
HA46	Apricot Place Seniors Complex	56	3 940	SSE	31.6
HA47	CPOA: Avondrust	161	4 101	S	32.3
HA48	ACVV: Huis Magnolia	104	4 205	SE	32.3
HA49	Kraaifontein Scottsville Eiken	156*	4 361	SE	32.4
HA50	CPOA: Ivan Hampshire	60	4 421	S	32.7
HA51	CPOA: Lilyhaven	126	4 547	SSE	32.9
HA52	CPOA: Erica Place	83	4 630	SSE	33.0
HA53	Communicare: Cresswell	62	4 692	S	33.1
HA54	CPOA: Nerina Place	98	4 790	SSE	33.1
HA55	Goeie Hoop Behuising Maatskappy: Huis Ravenzicht	99	4 889	SE	33.2
HA56	Groeneweide	61	4 950	N	33.4
HA57	Communicare: Huis Alleyne Yeld	71	5 021	SSE	33.4
HA58	ACVV: La Belle	102	5 123	SE	33.6
HA59	NG Kerk Goeie Hoop Behuising Maatskappy: Huis Nuweland	82	5 205	S	34.3
HA60	CPOA: Harfield	72	5 277	S	34.4

* Number of residents currently not available.

There are 60 homes for the aged within 35 km of the nuclear installation(s), with a total of approximately 5 277 residents. All except one of these homes are concentrated in the southeast, south-southeast and south segments. All homes are located further than 16 km from the nuclear installation(s). The nearest home is the Communicare Kent Durr facility, which has 180 residents and is located at 22.8 km south-southeast.

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NE
E
SE
S
SWARTLAND (LM)
CITY OF CAPE TOWN (LM)
DRAKENSTEIN (LM)
STELLENBOSCH (LM)
DUYNEFONTYN SITE
Robben Island
35km
16km
5km
-70000
-60000
-50000
-40000
-30000
-20000
-3690000
-3700000
-3710000
-3720000
-3730000
-3740000
-3750000
-3760000
-3770000
Legend
Clinics (C)
Children's Homes (CH)
Early Childhood Development Centre (ECD)
Homes for the Aged (HA)
Homes for the Disabled (HD)
Prisons (P)
Informal Settlements (IS)
0 1 2 4 6 8 10
Kilometers
COORDINATE SYSTEM
Map projection: Gauss Conformal
Datum: Hartebeeshoek 94
Spheroid: WGS84
Scale factor: 1
Central meridian: LO19
Units: International meter
PLANNING PARTNERS
COMP NJ 22/02/2024
REV
SCALE 1:150 000
Eskom
SITE SAFETY REPORT FOR DUYNEFONTYN
SPECIAL POPULATION GROUPS (35 KM) :
CLINICS, CHILDREN'S HOMES,
EARLY CHILDHOOD DEVELOPMENT CENTRES,
HOMES FOR THE AGED, HOMES FOR THE DISABLED,
INFORMAL SETTLEMENTS & PRISONS
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5.4.7.2 Homes for the Disabled

The distribution, location and number of residents of homes for the disabled are presented in ***Table 5.4.14*** and graphically illustrated in ***Drawing 5.4.11*** (Planning Partners, 2020c).

There are 13 homes for the disabled within 35 km from the nuclear installation(s) with a combined total of approximately 550 persons. Two homes are located within 16 km of the nuclear installation(s). The Orion Home is located in Wesfleur (13.7 km north-northeast) and the Camphill Village Home is located in the Dassenberg smallholding area (15.6 km northeast). The remaining 11 homes are all located in the southeast, south-southeast and south segments.

Table 5.4.14
Homes for the Disabled within 35 km (2020)

Code in Drawing	Name of Home	Number of Residents	Cumulative Residents	Direction	Distance (km)
HD1	Orion Wesfleur	60	60	NNE	13.7
HD2	Camphill Village West Coast	92	152	NE	15.6
HD3	Eric Miles Home	45	197	SSE	23.8
HD4	ACVV Elizabeth Roos	43	240	S	27.9
HD5	Oasis Group Homes Ruyterwacht	16	256	SSE	28.6
HD6	Rosecourt	4	260	S	28.8
HD7	Alta du Toit Nasorg	147	407	SE	28.9
HD8	Quasar Trust	7	414	SE	29.7
HD9	Langa Cheshire Home	20	434	SSE	31.3
HD10	Hansie Vroom Home	35	469	SE	32.3
HD11	Huis El Roi	25	494	SE	32.5
HD12	Garden Cottage	8	502	SSE	34.0
HD13	Rosedon House	48	550	S	34.3

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5.4.7.3 Children's Homes

The distribution, location and number of residents of children's homes are presented in ***Table 5.4.15*** and graphically illustrated in ***Drawing 5.4.11*** (Planning Partners, 2020c).

There are 21 children's homes, with a total number of approximately 1 059 children, located within 35 km of the nuclear installation(s). There are no children's homes located within 16 km of the nuclear installation(s). The closest children's home is the Durbanville Children's Home at 26.5 km southeast with 144 children. All the homes are located in the southeast, south-southeast and south segments.

Table 5.4.15
Children's Homes within 35 km (2013 to 2020)

Code in Drawing	Name of Home	Number of Children	Cumulative Children	Direction	Distance (km)
CH1	Durbanville Children's Home	144	144	SE	26.5
CH2	Salesian Institute Youth Centre	12	156	S	26.6
CH3	The Homestead	65	221	S	26.7
CH4	Ubuntu Home	10	231	SSE	26.8
CH5	Lawrence House	25	256	S	28.0
CH6	Percy Bartlett House	10	266	S	28.0
CH7	Nazareth House	64	330	S	28.9
CH8	SA Children's Home	10	340	S	28.9
CH9	SOS Children's Home	120	460	SSE	29.0
CH10	Oranjia Jewish Children's Home	10	470	S	29.4
CH11	House of Thembiso	0*	470	SE	30.0
CH12	Ons Plek	34	504	S	30.3
CH13	Huis Vredelus Secure Care Centre	67	571	SSE	30.4
CH14	Christine Revel Children's Home	49	620	SSE	32.1
CH15	CMH Renaissance Program (GC Williams Children's	70	690	SSE	32.2

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Code in Drawing	Name of Home	Number of Children	Cumulative Children	Direction	Distance (km)
	Home)				
CH16	Marsh Memorial Home	60	750	S	32.4
CH17	Holy Cross	115	865	SSE	33.6
CH18	St. Francis Children's Home	45	910	SSE	33.6
CH19	Heatherdale Children's Home	55	965	SSE	33.7
CH20	Girls & Boys Town, Claremont	10	975	S	33.8
CH21	Lelieblom House	84	1 059	SSE	34.2

* Number of children currently not available.

5.4.7.4 Prisons

There is one prison facility located within 35 km from the nuclear installation(s) (refer to ***Table 5.4.16*** and ***Drawing 5.4.11***) (Planning Partners, 2020c). The Goodwood Correctional Centre is located at 25.4 km south-southeast and has a capacity of 2 115 prisoners.

Table 5.4.16
Prisons within 35 km (2020)

Code in Drawing	Name of Prison	Number of Prisoners	Staff	Direction	Distance (km)
P1	Goodwood Correctional Centre	Capacity: 2 115 Actual: 2 438 *	353	SSE	25.4

* The actual number of prisoners varies each day according to newly incarcerated inmates and released inmates.

5.4.7.5 Hospitals and Clinics

The location of hospitals has been determined per sector and the results are presented in ***Table 5.4.17*** below and are graphically illustrated in ***Drawing 5.4.12*** (Planning Partners, 2020c). As hospitals form part of emergency support locations, data relating to hospitals have been presented for a larger region, i.e. up to 80 km.

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In addition, the location of clinics (or community health centres) has been identified and is presented in ***Table 5.4.18*** and graphically illustrated in ***Drawing 5.4.11*** (Planning Partners, 2020c). The location of clinics has been identified up to a distance of 35 km from the nuclear installation(s).

There are 47 public and private hospitals located within 80 km of the nuclear installation(s). The two hospitals nearest to the nuclear installation(s) are the Wesfleur Hospital in Atlantis (13.8 north-northeast) with 50 beds and the Blaauwberg Netcare (14.9 km south-southeast) with 180 beds. These are also the only two hospitals located within the site vicinity (i.e. 16 km radius).

Twenty-six hospitals (55.3 per cent) are located within a 35 km distance from the nuclear installation(s). They account for 66.6 per cent of the total number of beds available within a distance of 80 km from the nuclear installation(s). The largest proportion of the 47 hospitals is located in the southeast, south-southeast and southern segments.

Table 5.4.17
Hospitals within 80 km (2020)

Code in Drawing	Name of Hospital	Capacity (Beds)	Cumulative Beds	Direction	Distance (km)
H1	Wesfleur Hospital	50	50	NNE	13.8
H2	Netcare Blaauwberg	180	230	SSE	14.9
H3	Mediclinic Milnerton	162	392	SSE	22.1
H4	Brooklyn Chest Hospital	349	741	SSE	25.3
H5	New Somerset Hospital	352	1 093	S	25.4
H6	Mediclinic Panorama	400	1 493	SSE	25.9
H7	Mediclinic Durbanville	205	1 698	SE	26.5
H8	Netcare Christiaan Barnard Memorial Hospital	276	1 974	S	26.8
H9	Netcare N1 City	210	2 184	SSE	26.8
H10	Alexandra Hospital	300	2 484	S	28.5
H11	Mediclinic Cape Town	128	2 612	S	28.8
H12	Karl Bremer	311	2 923	SE	28.9
H13	Valkenberg	386	3 309	S	29.4

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Code in Drawing	Name of Hospital	Capacity (Beds)	Cumulative Beds	Direction	Distance (km)
H14	Groote Schuur	975	4 284	S	29.5
H15	Netcare UCT Private Academic	103	4 387	S	29.5
H16	Mediclinic Louis Leipoldt	186	4 573	SE	30.1
H17	Life Vincent Pallotti	57	4 630	SSE	30.2
H18	Mowbray Maternity Hospital	205	4 835	S	30.5
H19	Melomed Bellville	123	4 958	SE	30.7
H20	Tygerberg Hospital	1 384	6 342	SE	30.9
H21	Mediclinic Cape Gate	150	6 492	SE	31.1
H22	Red Cross War Memorial Children Hospital	272	6 794	S	31.2
H23	Stikland Hospital	423	7 187	SE	32.3
H24	Melomed Gatesville	200	7 387	SSE	33.9
H25	Life Kingsbury	226	7 613	S	34.5
H26	Netcare Kuils River	175	7 788	SE	35.0
H27	Malmesbury ID Hospital	49	7 837	NE	35.3
H28	Swartland Hospital	41	7 878	NE	36.6
H29	Victoria Hospital	184	8 062	S	37.3
H30	Mediclinic Constantiaberg	236	8 298	S	39.0
H31	Mitchell's Plain Hospital	395	8 693	SSE	41.9
H32	Lentegeur Hospital	690	9 383	SSE	42.3
H33	DP Marais Hospital	260	9 643	S	42.9
H34	Melomed Tokai	148	9 791	S	43.5
H35	Eerste River Hospital	150	9 941	SE	44.5
H36	Melomed Mitchells Plain	136	10 077	SSE	45.0
H37	Khayelitsha Hospital	340	10 417	SSE	47.2
H38	Mediclinic Stellenbosch	20	10 437	SE	48.8
H39	Stellenbosch Hospital	85	10 522	SE	49.4
H40	Mediclinic Stellenbosch Head Office	95	10 617	SE	50.0
H41	Mediclinic Paarl	143	10 760	E	50.1

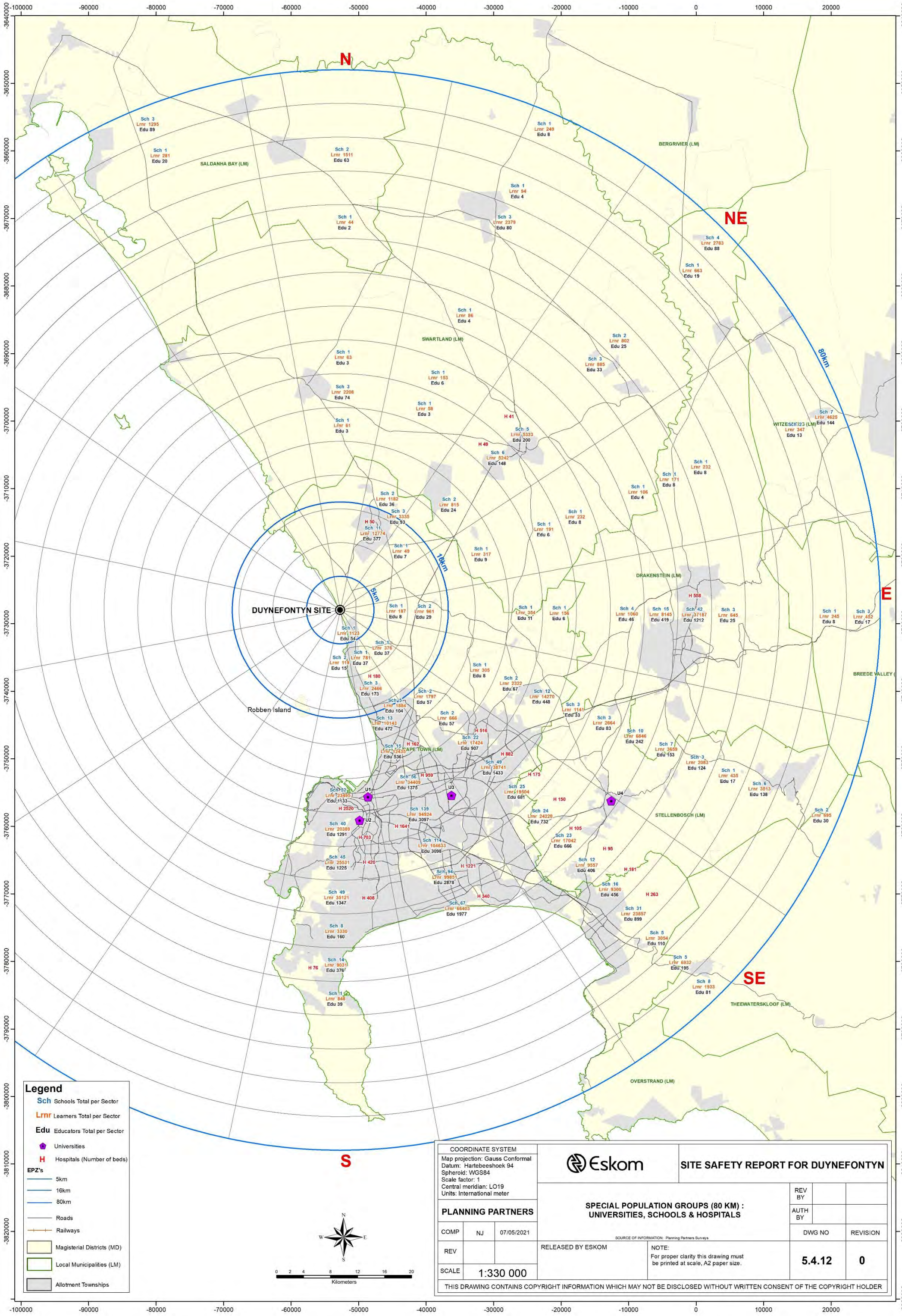
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Code in Drawing	Name of Hospital	Capacity (Beds)	Cumulative Beds	Direction	Distance (km)
H42	Paarl Hospital	331	11 091	E	50.2
H43	False Bay Hospital	76	11 167	S	50.4
H44	Sonstraal Hospital	84	11 251	E	51.7
H45	Helderberg Hospital	181	11 432	SE	59.3
H46	Mediclinic Vergelegen	237	11 669	SE	60.6
H47	Mediclinic Strand	26	11 695	SE	61.2

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COORDINATE SYSTEM			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter					REV BY	
PLANNING PARTNERS			SPECIAL POPULATION GROUPS (80 KM) : UNIVERSITIES, SCHOOLS & HOSPITALS		AUTH BY	
COMP	NJ	07/05/2021	SOURCE OF INFORMATION: Planning Partners Surveys		DWG NO	REVISION
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at scale, A2 paper size.	5.4.12	0
SCALE	1:330 000					

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A total of 36 clinics or community health facilities are located within 35 km of the nuclear installation(s). The Seapark Clinic in Melkbosstrand is the nearest clinic to the nuclear installation(s) at 4.5 km south-southeast. The Seapark Clinic specialises in Dementia and Alzheimer patients. A total of 35 patients is permanently housed at this clinic.

Table 5.4.18
Community Health Centres / Clinics within 35 km (2020)

Code in Drawing	Name of Clinic	Direction	Distance (km)
C1	Seapark Clinic (Melkbosstrand)	SSE	4.5
C2	Melkbosstrand Satellite Clinic	SSE	4.7
C3	Mamre Community Day-care (CDC)	NNE	18.7
C4	Du Noon CDC	SSE	19.0
C5	Chatsworth Satellite Clinic	NE	20.1
C6	Bothasig CDC	SSE	22.6
C7	Riverlands Satellite Clinic	NE	22.7
C8	Kalbaskraal Satellite Clinic	ENE	23.0
C9	Green Point CDC	S	25.5
C10	Durbanville CDC	SE	26.8
C11	Kensington CDC	SSE	26.9
C12	Cape Town Reproductive Health Centre (RHC)	S	27.3
C13	Long Street RHC	S	27.5
C14	Maitland Oral Health Services	SSE	27.7
C15	Maitland CDC	SSE	27.7
C16	District Six CDC	S	28.0
C17	Goodwood CDC	SSE	28.2
C18	Hope Street Oral Health Centre	S	28.2
C19	Bishop Lavis CDC	SSE	28.9
C20	Parow CDC	SSE	29.1
C21	Ruyterwacht CDC	SSE	29.6
C22	Bellville RHC	SE	30.7
C23	Tygerberg Oral Health Centre	SE	30.8

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Code in Drawing	Name of Clinic	Direction	Distance (km)
C24	Abbotsdale Satellite Clinic	NE	30.9
C25	Elsies River RHC	SSE	31.3
C26	Ravensmead CDC	SSE	31.6
C27	Reed Street CDC	SE	31.7
C28	Vanguard RHC	SSE	31.8
C29	Dr Abdurahman CDC	SSE	32.3
C30	Bellville South CDC	SE	32.9
C31	Kraaifontein RHC	SE	33.3
C32	Silvertown Oral Health Service	SSE	33.5
C33	Heideveld CDC	SSE	34.0
C34	Scottsdene CDC	SE	34.1
C35	Darling Clinic	N	34.3
C36	Malmesbury CDC	NE	34.5

5.4.7.6 Educational Facilities

Universities

As large universities may form part of emergency support locations, data relating to universities have been presented for the site region (i.e. 80 km radius). Four universities were identified and are presented in ***Table 5.4.19*** and graphically illustrated in ***Drawing 5.4.12*** (Planning Partners, 2020c).

The Cape Peninsula University of Technology, with an approximate enrolment of 34 222 students, is the nearest university to the nuclear installation(s) at 28.1 km south.

Table 5.4.19
Universities within 80 km (2017 & 2018)

Code in Drawing	Name of University	Students	Educators	Direction	Distance (km)
U1	Cape Peninsula University of Technology	34 222	841	S	28.1

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Code in Drawing	Name of University	Students	Educators	Direction	Distance (km)
U2	University of Cape Town	28 701	1 170	S	31.3
U3	University of the Western Cape	22 835	1 152	SSE	33.8
U4	University of Stellenbosch	31 260	543	SE	49.1

Schools

As schools may form part of emergency support locations, data relating to schools have been presented up to 80 km from the nuclear installation(s) (Planning Partners, 2020c).

The location and attendance of schools per sector is given in ***Appendix 5.4.I***. A summary of the number of schools per sector is shown in ***Table 5.4.20*** below and a summary of the number of learners per sector is shown in ***Table 5.4.21*** below. ***Drawing 5.4.12*** indicates the number of schools and learners per sector.

A total of 1 142 schools are located within 80 km of the nuclear installation(s). The 2018 enrolment figures for these schools amounted to a total of approximately 857 208 learners and approximately 30 837 educators.

The nearest school to the nuclear installation(s) is Van Riebeeckstrand Primary School at 3.4 km south-southeast with 1 123 learners in 2018. A total of 31 schools (2.7 per cent) are located within the site vicinity (16 km radius) with a recorded enrolment of approximately 24 055 learners in 2018.

The pattern of distribution of schools shows concentrations that are closely related to the urban centres around the nuclear installation(s). The sectors between north-northwest and east account for only 13 per cent of the schools. The remaining 87 per cent of schools are located in the east-southeast, southeast, south-southeast and south sectors. The majority of schools (944 schools or 83 per cent) are located in the southeast, south-southeast and south segments and between the 20 to 50 km annulus.

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Table 5.4.20
Summary: Schools per Sector within 80 km (2018)

Radius (km)	Direction										Total
	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	S	
0 – 5									1		**1**
5 – 10						1		1	1	2	**5**
10 – 16			14	1		2			8		**25**
16 – 20			2					2	13		**17**
20 – 25				2	1		1	2	15		**21**
25 – 30		1				1	2	22	56	52	**134**
30 – 35		3	1	6	1	1	12	49	139	40	**252**
35 – 40		1	1	5	1		3	25	114	45	**195**
40 – 45						4	3	24	94	49	**174**
45 – 50			1		1	15	10	23	67	8	**125**
50 – 55				3	1	42	7	12		14	**79**
55 – 60		1		2	1	3	3	16		1	**27**
60 – 65			3				1	31			**35**
65 – 70		2	1				6	5			**14**
70 – 75	1			1	2	1		5			**10**
75 – 80	3		1	4	7	3	2	8			**28**
Total	**4**	**8**	**24**	**24**	**15**	**73**	**50**	**225**	**508**	**211**	**1 142**

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Table 5.4.21
Summary: Learners per Sector within 80 km (2018)

Radius (km)	Direction										Total
	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	S	
0 – 5									1 123		**1 123**
5 – 10						187		376	781	119	**1 463**
10 – 16			16 109	49		961			4 350		**21 469**
16 – 20			1 182					1 797	10 143		**13 122**
20 – 25				815	317		305	666	12 435		**14 538**
25 – 30		61				354	2 322	17 424	34 409	23 495	**78 065**
30 – 35		2 208	58	5 242	191	156	14 270	38 741	94 924	20 389	**176 179**
35 – 40		63	153	5 323	232		1 141	19 504	104 622	2 553	**156 580**
40 – 45						1 060	2 664	24 228	99 851	35 121	**162 924**
45 – 50			86		106	8 145	6 846	17 042	66 403	3 330	**101 958**
50 – 55				885	171	37 187	3 659	9 557		9 031	**60 490**
55 – 60		44	802		232	645	2 083	9 300		848	**13 954**
60 – 65			2 379				435	23 857			**26 671**
65 – 70		1 511	94				3 513	3 054			**8 172**
70 – 75	281			663	347	245		6 932			**8 468**
75 – 80	1 295		249	2 783	4 625	452	695	1 933			**12 032**
Total	**1 576**	**3 887**	**21 113**	**15 760**	**6 221**	**49 392**	**37 932**	**174 411**	**429 052**	**117 864**	**857 208**

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Day-care Facilities / Early Childhood Development Centres

The distribution of day-care facilities or Early Childhood Development Centres (ECDCs) within 35 km of the nuclear installation(s) is presented in ***Table 5.4.22*** below and are graphically illustrated in ***Drawing 5.4.11*** (Planning Partners, 2020c).

A summary of the distribution of the ECDCs per sector and a summary of the number of children per sector are shown in ***Tables 5.4.23*** and ***5.4.24*** respectively.

Only 6 of the 102 ECDCs are located within the site vicinity (i.e. 16 km radius), accommodating 304 children.

The pattern of distribution of ECDCs shows, as in the case of schools, concentrations that are closely related to the urban centres surrounding the nuclear installation(s). A total of 102 ECDCs were located within 35 km of the nuclear installation(s) during 2020. These centres contained a total of approximately 5 668 children. The southeast, south-southeast and south segments contain 93 per cent of the ECDCs.

The nearest ECDC to the nuclear installation(s) is Babbel en Krabbel in Melkbosstrand at 4.8 km south-southeast, with 57 children.

Table 5.4.22
Early Childhood Development Centres or Day-Care Centres within 35 km (2020)

Code in Drawing	Name	Children	Cumulative Children	Distance (km)	Direction
DC1	Babbel en Krabbel	57	57	4.8	SSE
DC2	Silverstroom Pre-primary	53	110	13.4	NNE
DC3	Atlantis Methodist Educare Centre	58	168	14.5	NNE
DC4	Saxonsea Pre-primary	62	230	15.0	NNE
DC5	Peekaboo Day-care and Preschool	43	273	15.4	SSE
DC6	Wonderland Educare	31	304	15.5	SSE
DC7	Rainbow Land Pre-primary	57	361	16.2	SSE
DC8	Bloubergrant Pre-primary	51	412	16.3	SSE
DC9	Zoozoo Land, Parklands	34	446	16.8	SSE

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Code in Drawing	Name	Children	Cumulative Children	Distance (km)	Direction
DC10	Zoozoo Land Educare	59	505	16.9	SSE
DC11	Little Camelot	13	518	17.9	SSE
DC12	Ubunye Educentre	120	638	1857	SSE
DC13	L'Amour Martinelle Crèche	25	663	18.5	NNE
DC14	Exclusive Kidz Academy	36	699	19.0	SSE
DC15	Masikhululeke Educare	67	766	22.9	SSE
DC16	The Village Educare Centre and Pre-primary	35	801	23.8	SSE
DC17	Milnerton Pre-primary	90	891	23.9	SSE
DC18	Edgemead Pre-primary	173	1 064	24.1	SSE
DC19	Kings and Queens Educare	51	1 115	24.3	SSE
DC20	Klein Phisantekraal Pre-primary	64	1 179	24.5	SE
DC21	Joe Simon Pre-primary	76	1 255	25.1	SSE
DC22	Klippie Kids Pre-primary	63	1 318	25.2	E
DC23	Trekvoeltjies Pre-primary	31	1 349	25.4	SSE
DC24	Buzzi Bees Pre-primary and After Care	35	1 384	25.8	SSE
DC25	Eve's Shoe Educare	30	1 414	26.0	SSE
DC26	Nutwood Forest	23	1 437	26.0	S
DC27	Goodwood Park Pre-primary	44	1 481	26.5	SSE
DC28	Ysterplaat Pre-primary	48	1 529	26.6	SSE
DC29	Kensington (U.J.W.) Pre-primary	17	1 546	26.8	SSE
DC30	Gateway Children’s Centre	24	1 570	27.1	SSE
DC31	Klein Tygerdal Pre-primary	147	1 717	27.1	SSE
DC32	Bambi Day-care Centre	21	1 738	27.1	SSE
DC33	Valmary Park Pre-primary	83	1 821	27.1	SE
DC34	Tygerberg Kids	19	1 840	27.2	SSE
DC35	Watersprites Pre-primary	20	1 860	27.2	SSE
DC36	Welgemoed Pre-primary	162	2 022	27.4	SE
DC37	Kenridge Pre-primary	336	2 358	27.6	SE
DC38	Peter Pan Down Syndrome Pre-primary	297	2 655	27.6	SSE
DC39	German St. Martini Pre-primary	47	2 702	27.7	S

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Code in Drawing	Name	Children	Cumulative Children	Distance (km)	Direction
DC40	Stepping Stones Children's Centre	26	2 728	27.8	S
DC41	Pikkieland Pre-primary	159	2 887	27.9	S
DC42	Kid's Kingdom Preschool	71	2 958	28.0	SE
DC43	Shereens Montessori	25	2 983	28.2	S
DC44	Green's Cool Early Learning Centre	14	2 997	28.3	SSE
DC45	Tafelberg (NWMHF) Pre-primary	20	3 017	28.6	S
DC46	Shelley Street Educare Centre	0*	3 017	28.7	S
DC47	College of Cape Town Pre-primary	13	3 030	28.7	S
DC48	Village Tods Pre-primary	31	3 061	28.9	S
DC49	SOS Children's Village Kindergarten	43	3 104	29.0	SSE
DC50	Rosen Castle	32	3 136	29.0	SE
DC51	Pikkie Paradys Pre-primary and After Care	65	3 201	29.0	SE
DC52	Sterreliggieland Pre-primary	24	3 225	29.1	SE
DC53	Won Life Early Learning Centre	119	3 344	29.1	ESE
DC54	Gan Aviv Pre-primary	42	3 386	29.4	S
DC55	Eversdal Pre-primary	120	3 506	29.4	SE
DC56	La Gratitude Pre-primary	44	3 550	29.5	SSE
DC57	Oaktree Pre-primary	30	3 580	29.9	S
DC58	Meerendal Pre-primary	49	3 629	30.0	SSE
DC59	Beehive Montessori	49	3 678	30.6	SE
DC60	University Pre-primary	37	3 715	30.7	S
DC61	Avonwood Educare Centre	0*	3 715	30.8	SSE
DC62	Husami Educare	50	3 765	30.9	SSE
DC63	Deutscher Kindergarten	10	3 775	30.9	SE
DC64	Norwood Early Learning Centre Pre-primary	36	3 811	31.0	SSE
DC65	Koningspikkies Pre-primary	63	3 874	31.2	SE
DC66	Stepping Stones (Red Cross) Pre-primary	16	3 890	31.3	S
DC67	Husseland Pre-primary	60	3 950	31.3	SSE
DC68	La Petite Preschool	5	3 955	31.4	SSE
DC69	Abra Kedabra Crèche	26	3 981	31.5	SE

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Code in Drawing	Name	Children	Cumulative Children	Distance (km)	Direction
DC70	Chameleon Preschool and Educare Centre	6	3 987	31.6	SSE
DC71	La Rochelle Pre-primary	59	4 046	31.8	SE
DC72	Bonteheuwel ECDC (Kiddies Educare Centre)	0*	4 046	32.0	SSE
DC73	Early Learning Centre	34	4 080	32.4	SSE
DC74	Bridges Playcentre	19	4 099	32.5	SSE
DC75	Little Willow Montessori Pre-primary	23	4 122	32.7	SSE
DC76	SAWCO (Kraaifontein) Pre-primary	31	4 153	33.0	SE
DC77	Ecclesia Educare Centre	0*	4 153	33.0	SE
DC78	Kildare Pre-primary	94	4 247	33.1	S
DC79	Masjid-Us Salaam Pre-primary	94	4 341	33.1	SSE
DC80	Keurboom Nursery School	47	4 388	33.3	S
DC81	Darling Pre-primary	22	4 410	33.4	N
DC82	Little Bosch Grade R and Activity Centre	95	4 505	33.4	S
DC83	Church of Christ Pre-primary	25	4 530	33.4	SSE
DC84	Bairnsleigh Pre-primary	28	4 558	33.5	S
DC85	Toddlers College Pre-primary	38	4 596	33.5	SSE
DC86	Silverton Pre-primary	48	4 644	33.7	SSE
DC87	Belgravia Day-care Centre	17	4 661	33.7	SSE
DC88	Bubbalu Day-care Centre	33	4 694	33.8	SE
DC89	Sing for Africa, Happy Valley	60	4 754	33.9	SE
DC90	Nural Huda Nursery	100	4 854	34.0	SSE
DC91	Evita's Darlings	61	4 915	34.3	N
DC92	Habibia Junior Madressa Pre-primary	190	5 105	34.3	SSE
DC93	Lady Buxton Pre-primary	30	5 135	34.4	S
DC94	The Hill Pre-primary	15	5 150	34.4	S
DC95	Athlone Pre-primary	140	5 290	34.5	SSE
DC96	New Rest Educare Centre	21	5 311	34.5	SSE
DC97	Makazi Educare	29	5 340	34.7	SSE
DC98	Molteno Road Pre-primary	122	5 462	34.7	S
DC99	Harfield Pre-primary	74	5 536	34.7	S

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Code in Drawing	Name	Children	Cumulative Children	Distance (km)	Direction
DC100	The Children's Studio	24	5 560	34.8	S
DC101	Vrolike Vinkies Pre-primary	51	5 611	34.9	NE
DC102	Rainbow Educare	57	5 668	34.9	SSE

* Number of children currently not available.

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Table 5.4.23
Summary: Early Childhood Development Centres or Day-Care Centres per Sector within 80 km (2020)

Radius (km)	Direction										Total
	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	S	
0 – 5									1		**1**
5 – 10											**0**
10 – 16			3						2		**5**
16 – 20			1						7		**8**
20 – 25								1	5		**6**
25 – 30						1	1	8	16	11	**37**
30 – 35		2		1				9	22	11	**45**
Total	**0**	**2**	**4**	**8**	**0**	**1**	**1**	**18**	**46**	**22**	**102**

Table 5.4.24
Summary: Children at Early Childhood Development Centres or Day-Care Centres per Sector within 80 km (2020)

Radius (km)	Direction										Total
	NNW	N	NNE	NE	ENE	E	ESE	SE	SSE	S	
0 – 5									57		**57**
5 – 10											**0**
10 – 16			173						74		**247**
16 – 20			25						370		**395**
20 – 25								64	416		**480**
25 – 30						63	119	893	910	416	**2 401**
30 – 35		83		51				331	1 041	582	**2 088**
Total	**0**	**83**	**198**	**51**	**0**	**63**	**119**	**1 288**	**2 868**	**998**	**5 668**

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5.4.7.7 Seasonal Workers

According to the Statistics South Africa Census of Commercial Agriculture (2017) a total of 2 270 seasonal workers resided in the City of Cape Town municipal area during 2017 (Planning Partners, 2020c). A portion of the City of Cape Town falls within the 35 km radius from the nuclear installation(s), namely portions of the Blaauwberg, Northern, Table Bay and Tygerberg districts. Therefore, a portion of this figure would have resided within the 35 km radius. The exact number is however not known.

A portion of the Swartland municipal area also falls within the 35 km radius from the nuclear installation(s). According to the Statistics South Africa data, a total of 1 218 seasonal workers resided in this municipal area in 2017. A portion of this total would have resided in the settlements located in the 35 km radius (i.e. Darling, Chatsworth, Abbotsdale and Malmesbury). The exact number is however not known.

5.4.7.8 Informal Settlements

In South Africa, the development of informal settlements in peri-urban areas of cities and towns is partly explained by rapid urbanisation and population growth. South Africa is urbanising rapidly: in 2020, over two-thirds (67 per cent) of its population were living in urban areas, and by 2050, South Africa's population is projected to grow by an additional 19 to 24 million people, most of whom will be living in cities and towns (Planning Partners, 2023).

A number of informal settlements have been identified within 35 km of the nuclear installation(s) (Planning Partners, 2020c) (Planning Partners, 2023). The location of these settlements and their estimated number of informal dwellings are presented in ***Drawing 5.4.11*** and ***Table 5.4.25*** respectively.

A total of 44 informal settlements where located within 35 km of the nuclear installation(s) in 2023. These settlements contained a total of approximately 27 441 informal dwellings. The east-southeast, southeast, south-southeast and south segments collectively contained 82 per cent of the informal settlements. The east-northeast, northeast, north-northeast and north segments collectively contained 18 per cent of the informal settlements.

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The data indicate that the nearest informal settlement to the nuclear installation(s) is Kleinzouterivier settlement at 3.0 km east-southeast, with approximately 25 informal dwellings.

The data indicate that 17 informal settlements are located within the site vicinity (i.e. 16 km radius). These 17 settlements contained a total of approximately 5 021 informal dwellings.

In recent years, the City of Cape Town (along with much of the country) has experienced a significant increase in unlawful land occupation. The reasons behind the unlawful land occupations appear to be a combination of overwhelming density in existing informal settlements, issues of urban management, lack of available services in informal settlements, and more recently, the economic impact of the COVID-19 pandemic (Planning Partners, 2023).

Eskom cannot control development on land that it does not own. Therefore, Eskom cannot ensure that mitigation measures to prevent the uncontrolled expansion of informal settlements within the EPZ will be implemented. Instead, individual landowners, including government authorities, are responsible for monitoring unlawful occupation of land, as well as for actioning the necessary measures to remove unlawful occupants in a timeous manner (Planning Partners, 2023).

As part of the City of Cape Town’s efforts to control illegal occupation or invasion of land, it established the Anti-Land Invasion Unit, which is mandated by the City's Human Settlements Directorate to stop people who illegally occupy City- or Provincial-owned land. The unit has a 24-hour hotline on 021 480 7700, where members of the general public, including Eskom, may report instances of any land invasion or illegal occupancy of government-owned land. The report to the unit should include the location where the illegal occupancy or invasion is taking place, as well as a detailed summary of the nature of the invasion or occupancy. Eskom must therefore report any land invasions of concern that it becomes aware of to the unit, who may then act against the illegal occupants, provided that the land is owned by either the City of Cape Town or the Western Cape Government (Planning Partners, 2023).

In a more recent attempt to combat unlawful occupation of land within the Cape Metropolitan Area, the City of Cape Town approved the Unlawful Occupation By-Law, 2021 (City of Cape Town, 2021). The By-Law came into operation on 14 February 2022 when it was published in the

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Provincial Gazette (Western Cape Government, 2022). The By-Law outlines how the City of Cape Town intends to mitigate unlawful occupation of land located within its area of jurisdiction, *viz.*:

- identifying and monitoring land prone to unlawful occupation (section 7 of the By-Law);
- providing steps to prevent unlawful occupation on identified land (section 8 of the By-Law);
- responding to unlawful occupation on land under the control of the City (section 9 of the By-Law);
- stating obligations of owners other than the City in responding to unlawful occupation (section 10 of the By-Law).

Importantly, the By-Law sets out procedures and obligations for both the City of Cape Town and private landowners with regard to land that is unlawfully occupied.

Table 5.4.25
Informal Settlements within 35 km (2023)

Code in Drawing	Name of Settlement	No. of Structures	Direction	Distance (km)
IS1	Klein Zoute Rivier	25	ESE	3.2
IS2	Vredelust Farm	47	SSE	5.4
IS3	Wolwerivier / Wolwefontein Extension	54	SE	10.1
IS4	Dassenberg Drive	16	NNE	10.8
IS6	Witsand Invasion 1	694	NE	11.1
IS6	Witsand Invasion 2	24	NNE	11.1
IS7	Witsand Infills 2	239	NE	11.2
IS8	Witsand POS	372	NNE	11.2
IS9	Witsand Infills 1	56	NE	11.3
IS10	Witsand Infills 3	72	NE	11.5
IS11	Witsand Infills 4	23	NE	11.6
IS12	Witsand	2 848	NE	11.7

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Code in Drawing	Name of Settlement	No. of Structures	Direction	Distance (km)
IS13	Rasta Camp - Atlantis	7	NNE	12.2
IS14	Blouberg Sands	35	SSE	12.6
IS16	Silverstroom Road	486	N	13.4
IS16	Phillidelphia 2(backyard settlement)	8	E	15.6
IS17	Phillidelphia (backyard settlement)	15	E	15.6
IS18	Siyahlala Du Noon	7 375	SSE	18.1
IS19	Richwood	539	SSE	20.0
IS20	Siyahlala - Joe Slovo: Milnerton	769	SSE	21.3
IS23	Wash House Quarry	31	S	24.2
IS22	Koekoe Town	21	SSE	24.5
IS23	Sixth Avenue, Kensington	95	SSE	24.9
IS24	Klipheuwel	664	E	27.0
IS25	Epping Market	24	SSE	27.2
IS26	Gaza	27	SSE	28.1
IS27	Siyahlala, Langa	71	SSE	28.4
IS28	Intersite TRA	448	SSE	28.9
IS29	Joe Slovo North	192	SSE	28.9
IS30	Thabo Mbeki, Langa	131	SSE	29.0
IS31	Joe Slovo	3 020	SSE	29.5
IS32	Sweet Lips	38	SSE	30.1
IS33	Vygieskraal	237	SSE	30.6-
IS34	Fisantekraal	1 534	ESE	30.6
IS35	Hadjie Ebrahim Crescent	68	SSE	30.9
IS36	Sewende Laan, Valhalla Park	116	SSE	31.3
IS37	Malawi	532	SSE	31.5
IS38	Agste Laan, Valhalla Park	535	SSE	31.6
IS39	New Rest Remainder	66	SSE	31.8
IS40	Pook se Bos	185	SSE	32.0
IS41	Goliath	58	ESE	32.0

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Code in Drawing	Name of Settlement	No. of Structures	Direction	Distance (km)
IS42	Freedom Park, Airport	637	SSE	32.1
IS43	Kanana	3 684	SSE	32.5
IS44	Wallacedene	1 323	SE	35.8
Total		**27 441**		

5.4.8 Projected Population Distribution

5.4.8.1 Permanent Population Projection

The permanent population has been projected within the 80 km radius around the site up to the year 2096 (Planning Partners, 2021b).

Population projections for the permanent population have been presented based on existing reputable growth rates that have been estimated for the area, spatial planning directives and known growth rates (e.g. comparing current census data with previous census data for the area, estimated growth rates as obtained from local authorities and allocation of population numbers to sectors envisaged for future growth and development). A description and motivation of the growth rates applied are presented below, together with the basis for the projections and the methodology and sources used. Assumptions have also been stated and the reasons for such assumptions.

The population has been projected in five-year intervals for the lifetime of the nuclear installation(s).

For spatial planning purposes in South Africa, projections of population numbers and distribution are normally undertaken for a maximum period of 20 years. This constitutes best practice, as various factors influence population data and growth within a particular geographical region. Such factors include, *inter alia*, fertility rates, birth rates, infection rates of HIV/AIDS[7] and tuberculosis, death rates, migration, government policies and spending (e.g. economic policies, spatial policies such as the identification of new development nodes). These factors fluctuate over time and cannot be reliably foreseen over long periods. Subsequently,

[7] Human immunodeficiency virus (HIV)/Acquired immune deficiency syndrome or acquired immunodeficiency syndrome (AIDS).

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the reliability of projections of population numbers and distribution decreases over time.

The previous study regarding population projections for the City of Cape Town, conducted by Professor R E Dorrington from the University of Cape Town, Centre for Actuarial Research, opened with the following statement **(Eskom, 2022a)**:

"*Estimating and projecting the South African population has never been an easy task because of the paucity of data and the heterogeneous nature of the population. Such work is an order of magnitude more difficult at a regional level where migration is far more significant and not documented at all, and where there may be poorly understood regional deviations in fertility and mortality."*

The projected population figures referred to below need to be read and/or utilised with the abovementioned statement in mind. It can be expected that population growth rates and distribution will fluctuate over time depending on socio-economic conditions and variables.

As population data and growth rates are to a large extent dependant on variable factors, it is essential to update or confirm population distribution data and projected population data on a regular basis, e.g. shortly after the completion of national censuses.

Notwithstanding the above, in order to comply with the regulatory requirements and supporting guidance presented in ***Subsection 5.4.3*** (Regulatory Framework), population projections need to be undertaken for the life expectancy of the nuclear installation(s). For this reason, population growth within the 80 km radius around the site was projected up to 2096.

The methodology to estimate the projected population within the 80 km radius around the nuclear installation(s) contained a number of steps.

Firstly, the population growth rates between 2001 and 2011 were determined for each of the eight City of Cape Town administrative districts and for each portion of the nine local authorities located within the 80 km radius, by comparing the 2001 census data **(Eskom, 2022a)** and 2011 census data (Statistics South Africa, 2011) (Planning Partners, 2020a). The results of this analysis are contained in ***Appendix 5.4.J*** and ***Table 5.4.26*** below.

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Table 5.4.26
Estimated Population Growth Rates 2001 to 2011

City of Cape Town (CoCT) Administrative District and/or Local Authority	Estimated Growth Rate 2001 - 2011[8]
CoCT: Blaauwberg	6.0
CoCT: Cape Flats	2.3
CoCT: Helderberg	4.7
CoCT: Mitchells Plain/Khayalitsha	3.1
CoCT: Northern	3.5
CoCT: Southern	2.4
CoCT: Table Bay	2.6
CoCT: Tygerberg	2.5
Bergrivier	5.1
Breede Valley	3.6
Drakenstein	2.7
Overstrand	7.9
Saldanha Bay	5.1
Stellenbosch	3.2
Swartland	4.5
Theewaterskloof	1.8
Witzenberg	2.0

As can be noted in ***Table 5.4.26***, the Blaauwberg District within which the nuclear installation(s) is located, experienced substantial population growth between 2001 and 2011. The Blaauwberg District had the highest population growth rate within the City of Cape Town during this period.

Appendix 5.4.J also contains a comparison between the results of the aforementioned analysis of the 2001 and 2011 census data and population growth during this period as estimated by the City of Cape Town during 2019 (Planning Partners, 2021b). The results of the census data analysis and the City of Cape Town estimates for its total area of jurisdiction compare well, noting that the City of Cape Town's total population estimate is only 0.29 per cent higher than the census data analysis.

A comparison between the 2011 projected population as contained in the

[8] Derived from comparing the 2001 and 2011 census data.

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DSSR Section 5.4, Rev 0 **(Eskom, 2022a)** and the results of the 2011 census data (Statistics South Africa, 2011) (Planning Partners, 2020a) has also been undertaken. The results of this comparison are contained in ***Appendix 5.4.K***. The results indicate that the 2011 permanent population within the 80 km radius was underestimated by approximately 10 per cent in the DSSR Section 5.4, Rev 0 **(Eskom, 2022a)**. This underestimation of the 2011 projected population will also have a knock-on effect on the projected population numbers that had been estimated for subsequent year intervals in the DSSR Section 5.4, Rev 0 **(Eskom, 2022a)**.

The population projections for the City of Cape Town's area of jurisdiction as contained in the DSSR Section 5.4, Rev 0 **(Eskom, 2022a)** relied to a large extent on population numbers projected by Professor Dorrington from the University of Cape Town, Centre for Actuarial Research, dated December 2005. At the time, Dorrington's study was the most detailed, in-depth study regarding population numbers and expected growth rates in the City of Cape Town up to 2021 and was utilised by the City of Cape Town as an official source of information for planning purposes.

During 2012, Dorrington undertook a further study regarding population projections from 2011 to 2025 (Planning Partners, 2021b). The report notes that the population projections previously undertaken for the Western Cape Province and City of Cape Town are out of date and potentially unreliable in light of changing fertility, mortality, migration and HIV/AIDS patterns since they were undertaken. The report states further that the projections of the 2012 study were produced before the release of the 2011 census numbers and thus do not reflect the information contained in the 2011 census. The 2012 report also states that it is apparent that migration to the Western Cape has been at a significantly higher level than previously assumed by the projections, and thus the numbers contained in the 2012 study and his previous study are likely to underestimate the population to some extent.

Dorrington's 2012 report notes, *inter alia*, the following factors which led to the underestimation of population numbers and projections:

- the underestimation of the number of young children;
- the number of people infected with HIV, their survival to receiving treatment and survival once on treatment, and hence the impact of

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this, and various prevention interventions, on mortality over time;

- greater in-migration (and that the greater in-migration of people in the age group of 20 to 29 years also led to an increase in the number of births).

As Dorrington's 2012 report notes that there was an apparent underestimation of population numbers, the projected population numbers and resultant estimated population growth rates contained in the 2012 study were not utilised for the purpose of updating this revision of the DSSR.

Of importance however, it is noted in Dorrington's 2012 report that a decrease in the estimated population growth rates over time is still expected, as was noted in his 2005 study. For example, a decrease of approximately 38 per cent in the population growth rate between 2021 and 2026 is estimated for the City of Cape Town and a decrease of approximately 50 per cent is estimated for the Overberg municipal district to the southeast over the same time period. As will be more clearly indicated below, the City of Cape Town also predicts a decrease in the estimated population growth rates over time. Subsequently, a decrease in the estimated population growth rates over time has also been implemented in this revision of the DSSR.

During 2019, the City of Cape Town undertook baseline and analysis studies for each of the eight City of Cape Town administrative districts (Planning Partners, 2021b). These studies note the population growth rates per City of Cape Town administrative district over the total period from 2011 to 2018 as contained in ***Table 5.4.27*** below.

Table 5.4.27
City of Cape Town Estimated Population Growth Rates 2011 to 2018

City of Cape Town (CoCT) Administrative District	Estimated Growth Rate 2011 - 2018
CoCT: Blaauwberg	2.9
CoCT: Cape Flats	1.8
CoCT: Helderberg	3.4
CoCT: Mitchells Plain/Khayalitsha	2.4
CoCT: Northern	4.6

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City of Cape Town (CoCT) Administrative District	Estimated Growth Rate 2011 - 2018
CoCT: Southern	1.2
CoCT: Table Bay	2.9
CoCT: Tygerberg	1.4

As the City of Cape Town's 2019 baseline and analysis studies are more recent, the estimated population growth rates for the eight City of Cape Town administrative districts, as contained in ***Table 5.4.26***, have not been utilised for the purpose of population projections within the City of Cape Town from 2011 onwards. Rather, the estimated population growth rates as contained in ***Table 5.4.27***, have been utilised.

The City of Cape Town also undertook a detailed assessment during 2019 to estimate the population for 2019 within the 16 km annulus, the 16 to 20 km annulus and the 20 to 30 km annulus around the nuclear installation(s) (Planning Partners, 2021b). The population projections presented in ***Appendix 5.4.L***, which illustrates the population growth and population growth rates applied, have taken the results of this assessment into account. The findings of the City of Cape Town have been incorporated into ***Appendix 5.4.L*** to estimate the population within the 30 km radius for 2019. A new baseline population for 2019 was therefore created within the 30 km radius, as this assessment constitutes the most recent, in-depth study regarding population numbers within the 30 km radius. The findings of this assessment therefore enhance the data extracted from the City of Cape Town's 2019 baseline and analysis studies.

Adjustments to the distribution of population numbers were made between 2011 and 2031, a period of 20 years, based on the location of current and expected growth areas as advised by the City of Cape Town and contained in its municipal spatial development framework. The City of Cape Town Municipal Spatial Development Framework promotes a transition towards a more compact urban form, which is regarded as more resilient and sustainable. The City's focus is on inward growth and investment to support dense, diverse and transit orientated land uses. The Municipal Spatial Development Framework does however also provide for the development of currently undeveloped land on the fringes of the city.

As is the case in Dorrington's 2012 report, the City of Cape Town also predicts a decrease in the estimated population growth rates over time.

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In the City of Cape Town's population projections from 2016 to 2040 for the City of Cape Town as a whole (Planning Partners, 2021b), the City of Cape Town predicts an average decrease of approximately 12 per cent in the population growth rate for each five-year interval between 2016 and 2040. Subsequently, a decrease in the estimated population growth rates over time has been implemented in this revision of the DSSR. A downward trend in the population growth rate was applied to the eight City of Cape Town administrative districts and the portions of the nine local authorities located within the 80 km radius until 2031, i.e. constituting a 20-year projection term since the latest census, the accepted period for which projections are normally done in terms of spatial planning.

The population growth rates for the portions of the local municipal areas located outside of the City of Cape Town, as presented in ***Table 5.4.26***, have been utilised as a base for projections within these municipal areas. A conservative approach was adopted by only applying a downward population growth rate trend from 2021 to the local municipal areas located outside of the City of Cape Town.

The downward adjustment in growth rates after 2021 for the eight City of Cape Town administrative districts is based on the predicted average decrease of approximately 12 per cent, as highlighted above.

A downward adjustment in growth rates after 2021 for the portions of the nine local authorities located within the 80 km radius is based on a reduced growth rate of 20 percent applied to the municipal areas containing major or various urban settlements and a reduced growth rate of 50 percent applied to municipal areas containing predominantly rural and agricultural areas.

A constant growth rate was applied from 2031 onwards for the eight City of Cape Town administrative districts and the portions of the nine local authorities located within the 80 km radius, as the uncertainty of socio-economic conditions and variables increases substantially over time.

In summary, the individual growth rates applied within the City of Cape Town and the portions of the various local municipal areas are indicated in ***Table 5.4.28*** and implemented in ***Appendix 5.4.L***.

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Table 5.4.28
Population Growth Rates Applied

Local Authority and/or City of Cape Town (CoCT) Administrative District	Population Growth Rates Applied during specific Time Period						
	2001-2011 (StatsSA data)[9]	2011-2018 (CoCT data)[10]	2011-2018	2018-2021	2021-2026	2026-2031	2031-2096
CoCT: Blaauwberg	-	2.9	2.9	2.9	2.6	2.3	2.0
CoCT: Cape Flats	-	1.8	1.8	1.8	1.6	1.4	1.2
CoCT: Helderberg	-	3.4	3.4	3.4	3.0	2.6	2.3
CoCT: Mitchells Plain/Khayalitsha	-	2.4	2.4	2.4	2.1	1.8	1.6
CoCT: Northern	-	4.6	4.6	4.6	4.0	3.6	3.1
CoCT: Southern	-	1.2	1.2	1.2	1.1	0.9	0.8
CoCT: Table Bay	-	2.9	2.9	2.9	2.6	2.3	2.0
CoCT: Tygerberg	-	1.4	1.4	1.4	1.2	1.1	1.0
Bergrivier	5.1	-	5.1	5.1	2.6	1.3	0.7
Breede Valley	3.6	-	3.6	3.6	1.8	0.9	0.5
Drakenstein	2.7	-	2.7	2.7	2.2	1.8	1.4
Overstrand	7.9	-	7.9	7.9	4.0	2.0	1.0
Saldanha Bay	5.1	-	5.1	5.1	4.1	3.3	2.6
Stellenbosch	3.2	-	3.2	3.2	2.6	2.1	1.7
Swartland	4.5	-	4.5	4.5	3.6	2.9	2.3
Theewaterskloof	1.8	-	1.8	1.8	1.4	1.1	0.9
Witzenberg	2.0	-	2.0	2.0	1.6	1.3	1.0

The growth rates as presented in ***Table 5.4.28*** were applied to each sector within a specific administrative district or local municipal area as indicated in ***Appendix 5.4.L***.

The only exception to the population growth rates applied as presented in ***Table 5.4.28*** is the growth rates applied to the City of Cape Town administrative districts between 2019 and 2021 up to the 30 km radius.

[9] Statistics South Africa (StatsSA) Census 2001 and Census 2011. Growth rate of the portion of the local authority's geographical area located within the 80 km radius. Excludes City of Cape Town administrative districts.

[10] City of Cape Town (CoCT) estimates. Draft District Baseline and Analysis Reports, 28 November 2019. Excludes local authorities located outside of the City of Cape Town.

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To determine the projected population per sector within this annulus for 2021, the population growth trend between 2011 and 2019 was determined per sector based on the 2011 census data and the 2019 estimated population (***Appendix 5.4.L***). This exception was implemented as the 2019 population estimate within the 30 km radius constitutes the most recent, in-depth study to determine population numbers within this annulus.

The permanent staff component of the nuclear installation(s) was incorporated into the population projections (***Appendix 5.4.L***). An operational permanent staff of 1 385 employees was incorporated (Eskom, 2021a), which could equate to approximately 4 432 persons, i.e. at an average household size of 3.2 persons per household (Planning Partners, 2021b).

Where required, the estimations are based on the following calculations made to determine either the end population or the growth rate for the projected population in each sector (Eskom, 2014) (Eskom, 2022b):

$$End\ Population = P_1 \times ((1 + (g \div 100))^n$$

Where: P_1 *= population at beginning of period;*

g *= growth rate;*

n *= period in years.*

or

$$Growth\ Rate = ((P_2 \div P_1)^{1 \div n} - 1)) \times 100$$

Where: P_1 *= population at beginning of period;*

P_2 *= end population;*

n *= period in years.*

The permanent population distribution was projected in five-year intervals for an area up to 80 km from the nuclear installation(s) until 2096. The results are presented in ***Appendices 5.4.L*** and ***5.4.M***, ***Drawings 5.4.13*** to ***5.4.16*** and ***Figures 5.4.10*** to ***5.4.15*** below. The population projections within the 80 km radius around the nuclear installation(s) indicate, *inter alia,* approximately:

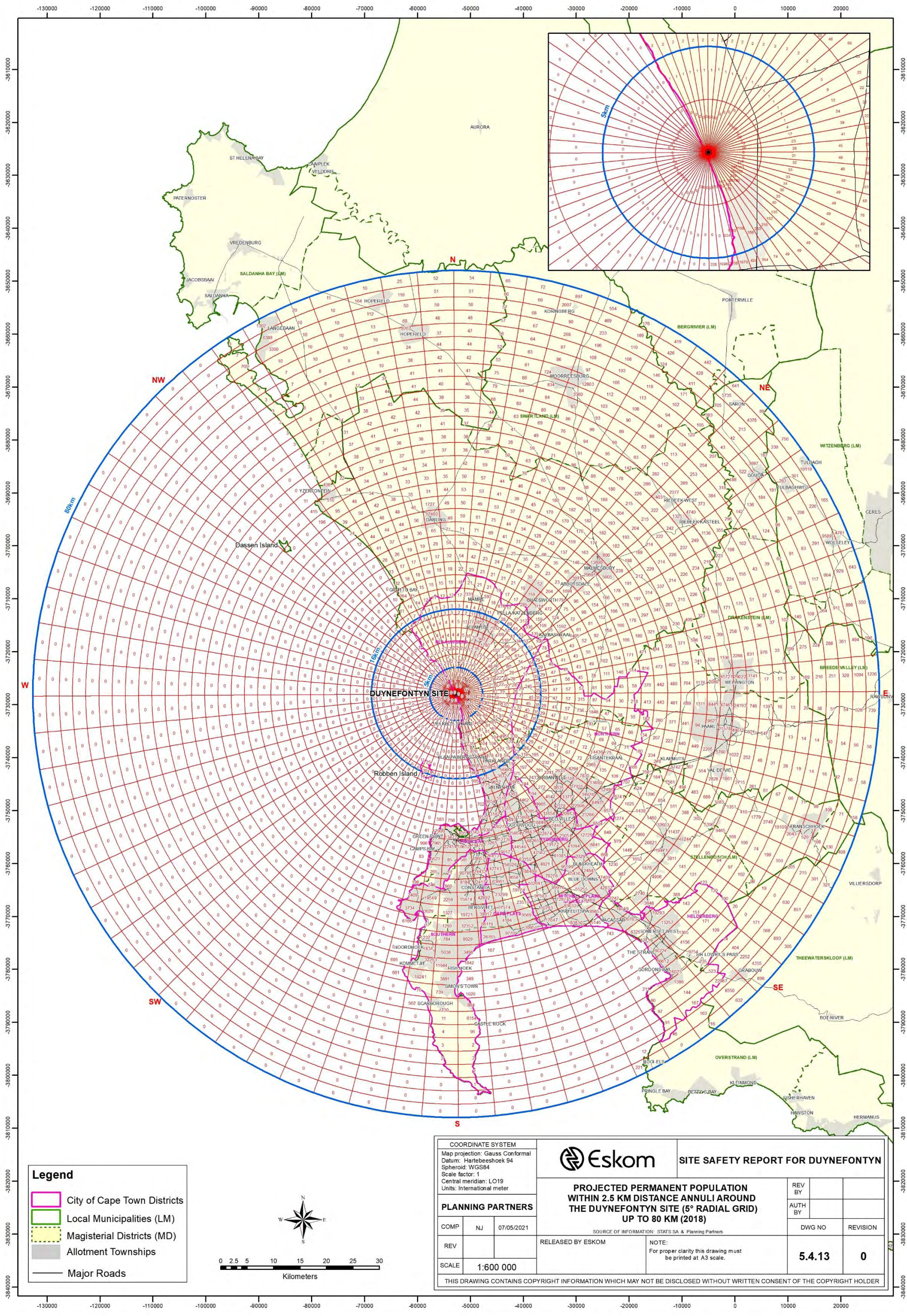
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- 5 128 040 persons in 2018;
- 6 134 620 persons in 2026;
- 8 682 380 persons in 2046;
- 21 594 510 persons by 2096.

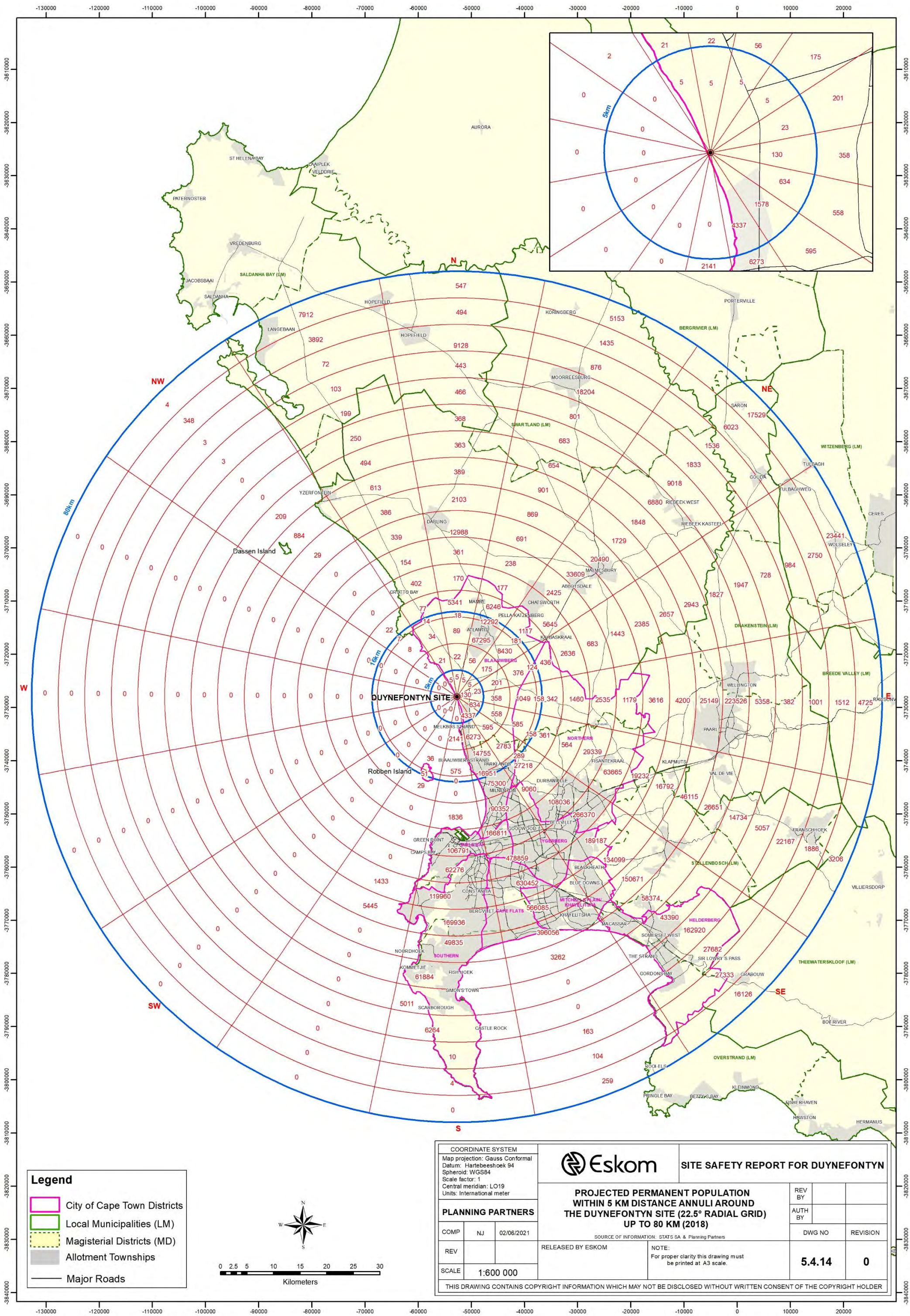
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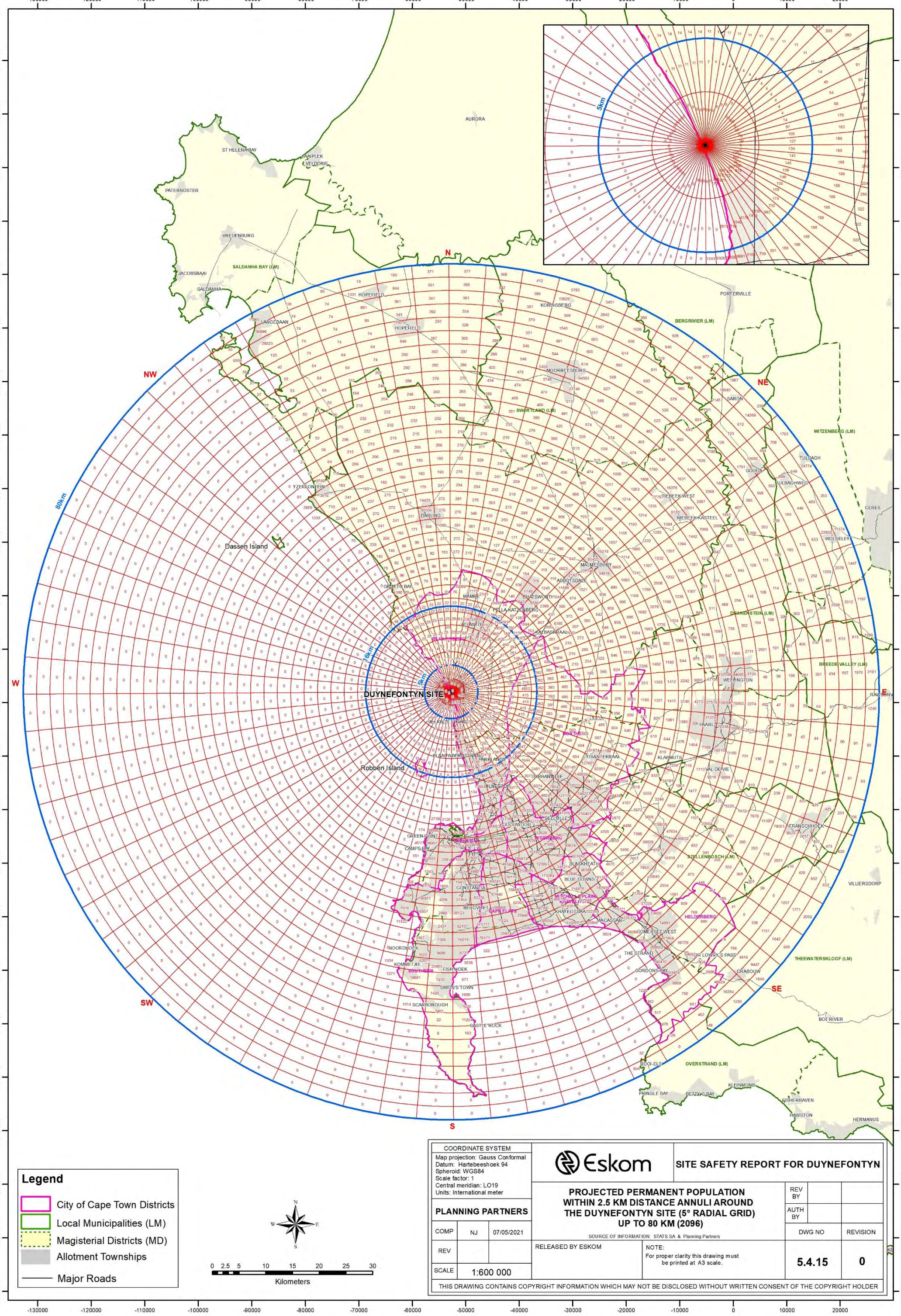
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COORDINATE SYSTEM			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			PROJECTED PERMANENT POPULATION WITHIN 2.5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (5° RADIAL GRID) UP TO 80 KM (2018) SOURCE OF INFORMATION: STATS SA & Planning Partners	REV BY		
PLANNING PARTNERS				AUTH BY		
COMP	NJ	07/05/2021		DWG NO		REVISION
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.13	0
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-3610000 -3620000 -3630000 -3640000 -3650000 -3660000 -3670000 -3680000 -3690000 -3700000 -3710000 -3720000 -3730000 -3740000 -3750000 -3760000 -3770000 -3780000 -3790000 -3800000 -3810000 -3820000 -3830000 -3840000
AURORA
ST HELENA BAY
LAAIPLEK
VELDDRIF
PATERNOSTER
VREDENBURG
SALDANHA BAY (LM)
JACOBSBAAI
SALDANHA
HOPEFIELD
LANGEBAAN
KORINGBERG
PORTERVILLE
BERGRIVIER (LM)
MOORREESBURG
SARON
SWARTLAND (LM)
WITZENBERG (LM)
TULBAGH
GOUDA
TULBAGHWEG
RIEBEEK WEST
RIEBEEK KASTEEL
CERES
WOLSELEY
YZERFONTEIN
DARLING
Dassen Island
MAMRE
CHATSWORTH
PELLA-KATZENBERG
ATLANTIS
KALBASKRAAL
ABBOTSDALE
MAIDSBURY
DRAKENSTEIN (LM)
BLAAUWBERG
BREEDE VALLEY (LM)
WELLINGTON
DUYNEFONTYN SITE
MELKBOS STRAND
BLAAUWBERGSTRAND
PARKLANDS
Robben Island
NORTHERN
FISANTEKRAAL
PAARL
KLAPMUTS
VAL DE VIE
DURBANVILLE
MILNERTON
BELLVILLE
GOODWOOD
GREEN POINT
CAMPS BAY
TYGERBERG
BLACKHEATH
BLUE DOWNS
CONSTANTIA
BERGVLIET
CAPE FLATS
KHAYELITSHA
MITCHELL'S PLAIN
MACASSAR
STELLENBOSCH (LM)
FRANSCHHOEK
VILLIERSDORP
HELDERBERG
SOMERSET WEST
THE STRAND
GORDONS BAY
SIR LOWRY'S PASS
GRABOUW
THEEWATERSKLOOF (LM)
BOT RIVER
OVERSTRAND (LM)
ROOI-ELS
PRINGLE BAY
BETTY'S BAY
KLEINMOND
RISHERHAVEN
HAWSTON
HERMANUS
SOUTHERN
NOORDHOEK
KOMMETJIE
FISH HOEK
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Legend

- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships
- Major Roads

0 2.5 5 10 15 20 25 30
Kilometers

COORDINATE SYSTEM		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter		
PLANNING PARTNERS		
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Eskom

SITE SAFETY REPORT FOR DUYNEFONTYN

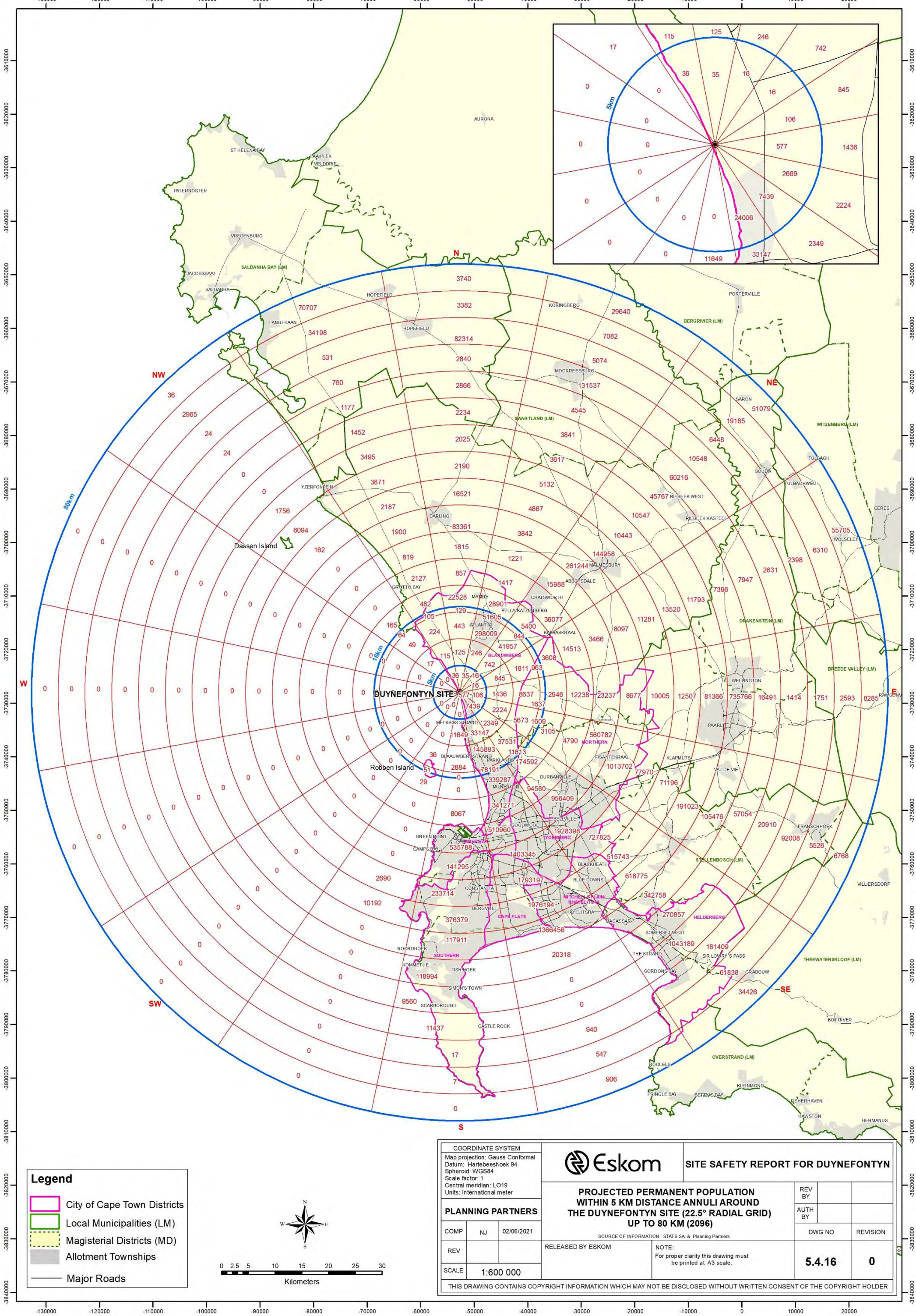
PROJECTED PERMANENT POPULATION WITHIN 2.5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (5° RADIAL GRID) UP TO 80 KM (2096)

SOURCE OF INFORMATION: STATS SA & Planning Partners

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Legend

- City of Cape Town Districts
- Local Municipalities (LM)
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- Allotment Townships
- Major Roads

COORDINATE SYSTEM			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			PROJECTED PERMANENT POPULATION WITHIN 5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (22.5° RADIAL GRID) UP TO 80 KM (2096) SOURCE OF INFORMATION: STATS SA & Planning Partners		REV BY	
PLANNING PARTNERS					AUTH BY	
COMP	NJ	02/06/2021			DWG NO	REVISION
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.16	0
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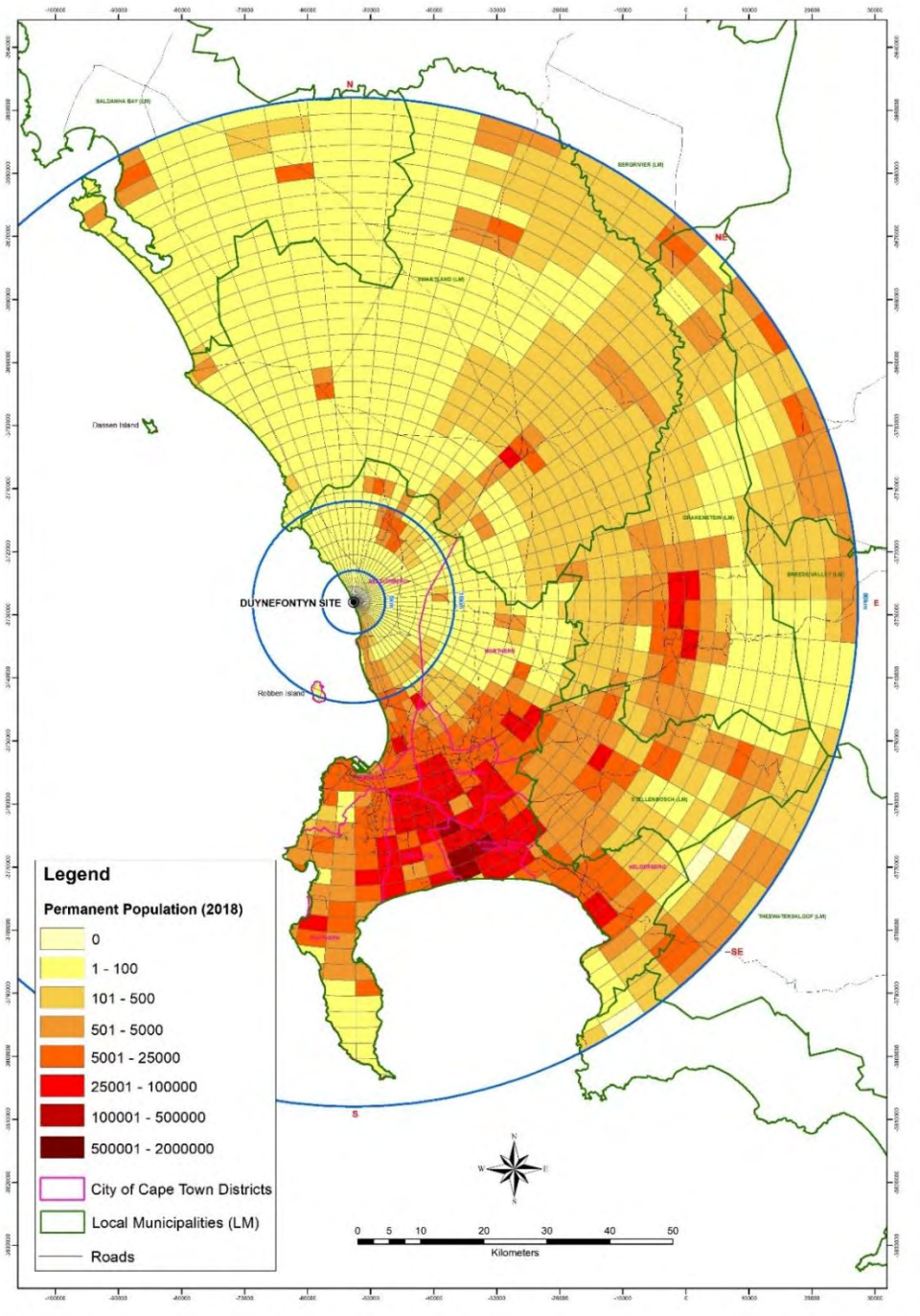


Figure 5.4.10
Projected Permanent Population Within 2.5 km Distance Annuli Around the Duynefontyn Site (5° Radial Grid) up to 80 km (2018)

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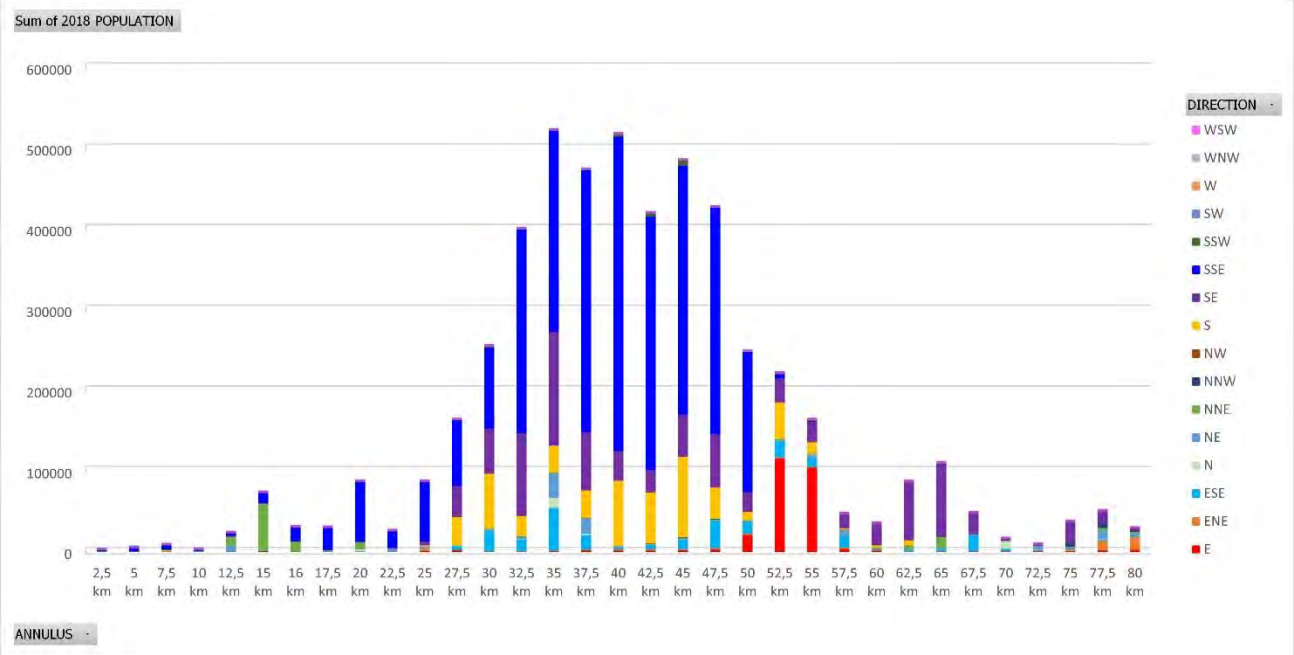


Figure 5.4.11
Projected Permanent Population Within 2.5 km Distance Annuli Around the Duynefontyn Site (5° Radial Grid) up to 80 km (2018)

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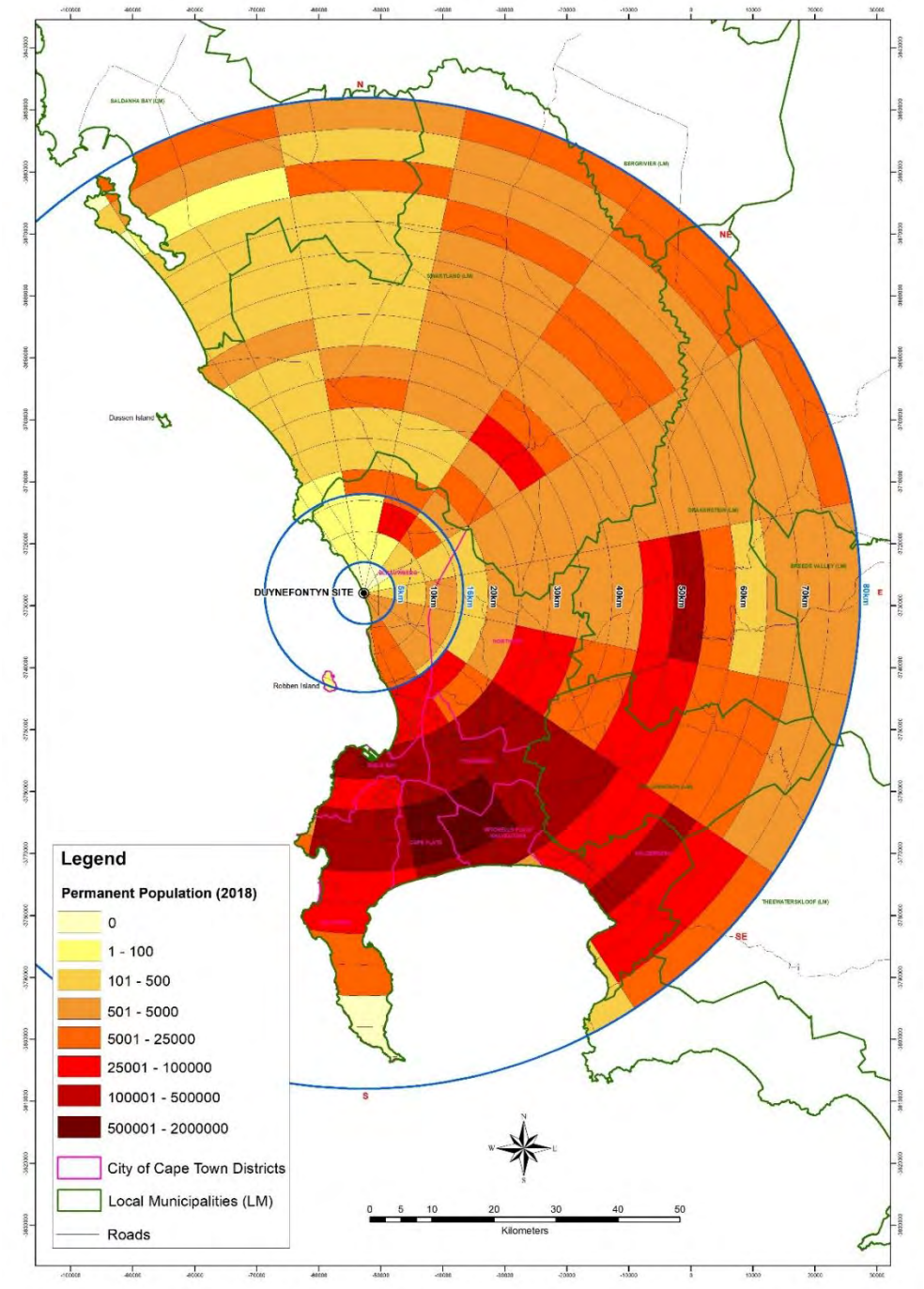


Figure 5.4.12
Projected Permanent Population Within 5 km Distance Annuli Around the Duynefontyn Site (22.5° Radial Grid) up to 80 km (2018)

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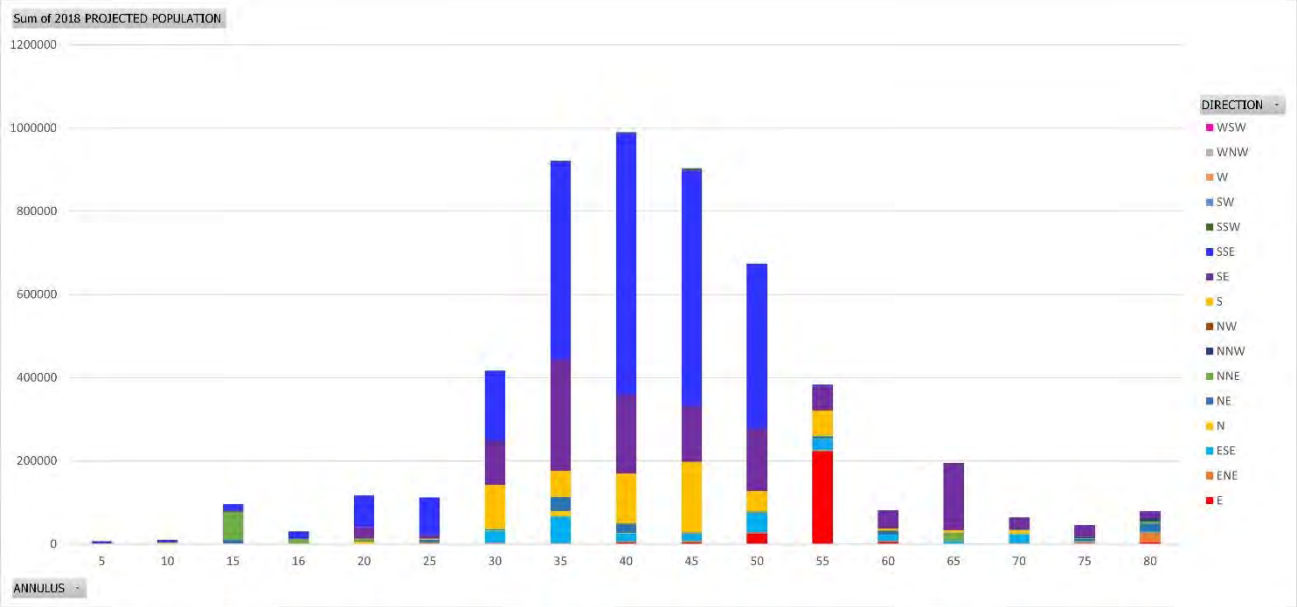


Figure 5.4.13
Projected Permanent Population Within 5 km Distance Annuli Around the Duynefontyn Site (22.5° Radial Grid) up to 80 km (2018)

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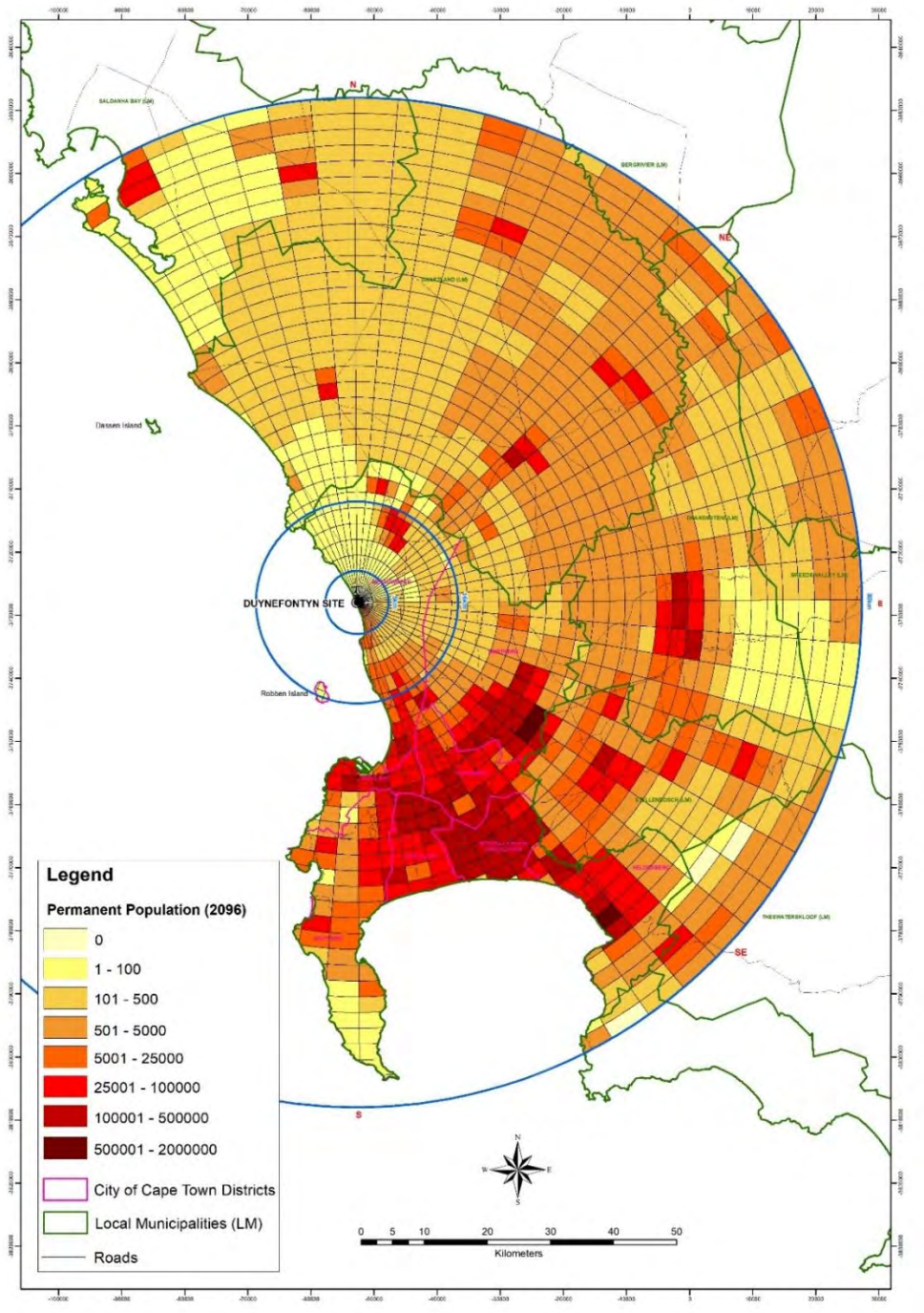


Figure 5.4.14
Projected Permanent Population Within 2.5 km Distance Annuli Around the Duynefontyn Site (5° Radial Grid) up to 80 km (2096)

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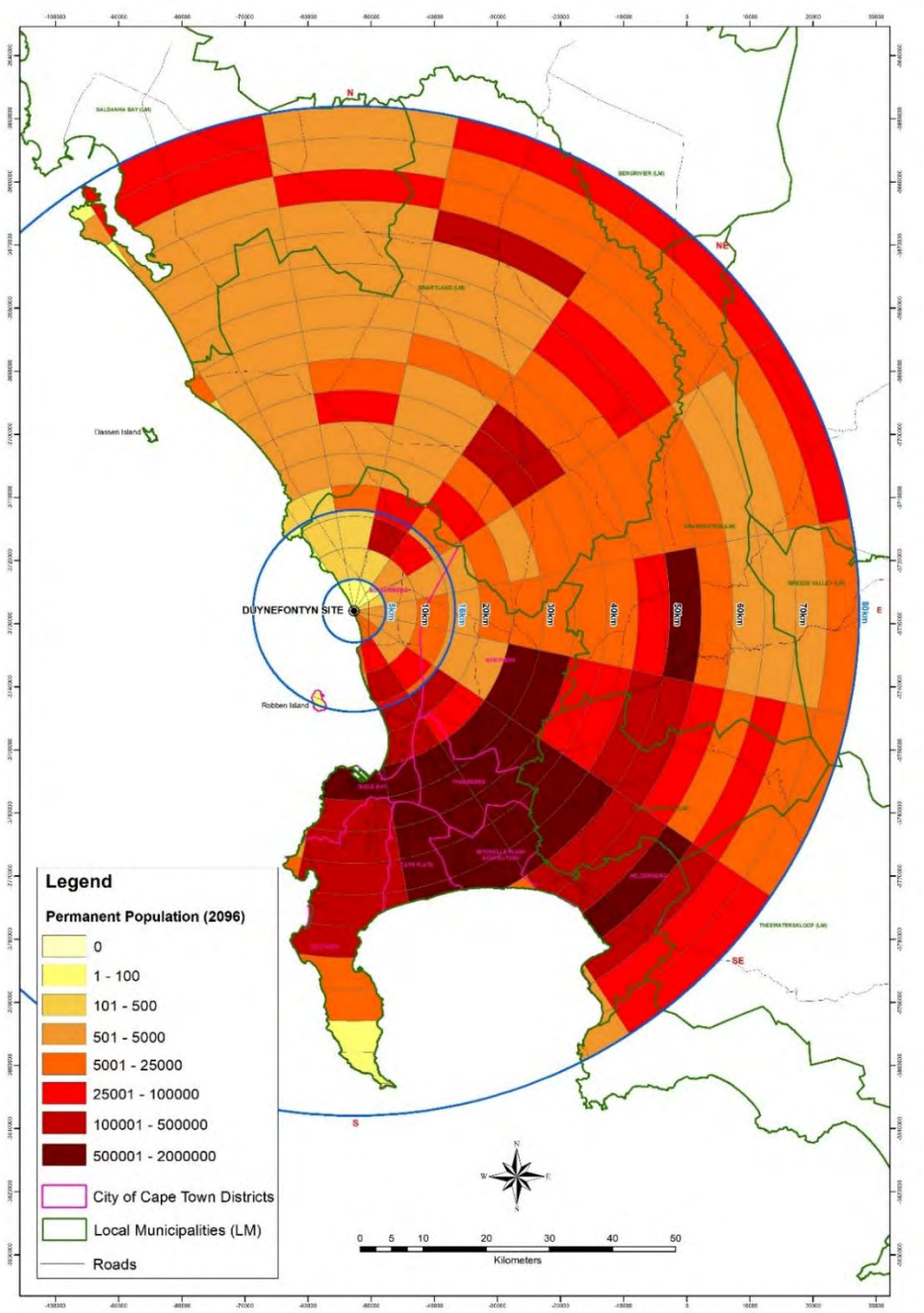


Figure 5.4.15
Projected Permanent Population Within 5 km Distance Annuli Around the Duynefontyn Site (22.5° Radial Grid) up to 80 km (2096)

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5.4.8.2 Population Density

Population densities have been analysed in order to determine whether they exceed the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) contained in ***Subsection 5.4.3.2*** (Guideline Documents). In this regard, emphasis is placed on the benchmark of a density of approximately 200 persons/km² and not the size of the population centre, as a large portion within the 80 km radius consists of ocean, i.e. does not contain residents. Please note that the referenced documents act only as a guide and are not an NNR requirement.

The analysis of the population and population density around the site includes the following:

- vicinity population and population density per sector (2018);
- regional population and population density per sector (2018);
- vicinity population and population density per sector (2026);
- regional population and population density per sector (2026);
- vicinity population and population density per sector (2046);
- regional population and population density per sector (2046);
- vicinity population and population density per sector (2096);
- regional population and population density per sector (2096).

The vicinity population density has been analysed for the 2 km, 5 km, 6.5 km, 10 km and 16 km distance annuli and 22.5º radial grids. The results are presented in ***Figures 5.4.16***, ***5.4.18***, ***5.4.20*** and ***5.4.22*** and ***Table 5.4.29*** below.

The regional population density is presented for annuli spaced 5 km apart and 22.5º radial grids within 80 km from the nuclear installation(s). The results for this analysis are presented in ***Figures 5.4.17***, ***5.4.19***, ***5.4.21*** and ***5.4.23*** and ***Table 5.4.29*** below.

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The following indicates the estimated population density with respect to various annuli within 80 km from the site centroid as extracted from the results of the analysis:

- **2 km Radius**

  As no persons reside within the 2 km radius, the average population density is 0 persons/km^2 for 2018, 2026, 2046 and 2096.

- **5 km Radius**

  The average population density within the 5 km radius (i.e. an area of approximately 49 km^2) is projected to be approximately 137 persons/km^2 in 2018, approximately 180 persons/km^2 in 2026, approximately 265 persons/km^2 in 2046 and approximately 712 persons/km^2 by 2096.

- **6.5 km Radius**

  The average population density within the 6.5 km radius (i.e. an area of approximately 79 km^2) is projected to be approximately 115 persons/km^2 in 2018, approximately 175 persons/km^2 in 2026, approximately 263 persons/km^2 in 2046 and approximately 596 persons/km^2 by 2096.

- **16 km Radius**

  The average population density within the 16 km radius (i.e. an area of approximately 498 km^2) is projected to be approximately 288 persons/km^2 in 2018, approximately 370 persons/km^2 in 2026, approximately 574 persons/km^2 in 2046 and approximately 1 562 persons/km^2 by 2096.

- **35 km Radius**

  The average population density within the 35 km radius (i.e. area of approximately 2 287 km^2) is projected to be approximately 748 persons/km^2 in 2018, approximately 906 persons/km^2 in 2026, approximately 1 362 persons/km^2 in 2046 and approximately 4 084 persons/km^2 by 2096.

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- **50 km Radius**

  The average population density within the 50 km radius (i.e. approximately 4 740 km^2) is projected to be approximately 903 persons/km^2 in 2018, approximately 1 074 persons/km^2 in 2026, approximately 1 513 persons/km^2 in 2046 and approximately 3 750 persons/km^2 by 2096.

- **80 km Radius**

  The average population density within the 80 km radius (i.e. approximately 11 004 km^2) is projected to be approximately 466 persons/km^2 in 2018, approximately 558 persons/km^2 in 2026, approximately 789 persons/km^2 in 2046 and approximately 1 962 persons/km^2 by 2096.

The population projections indicate that the site conforms to the abovementioned international guidance for the 6.5 km radius in 2018 and 2026.

Based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection), the site may possibly not conform to these guidelines for the 6.5 km radius in 2046 and 2096 and the 16 km, 35 km and 50 km radii for 2018, 2026, 2046 and 2096. Please note that the referenced documents act only as a guide and are not an NNR requirement.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the City of Cape Town Municipal Spatial Development Framework (2023) (City of Cape Town, 2023a), the Blaauwberg District Spatial Development Framework (2023) (City of Cape Town, 2023b) and the City of Cape Town Municipal Planning By-Law, 2015 (City of Cape Town, 2015) with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

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Table 5.4.29
Projected Permanent Population Density (2018, 2026, 2046 and 2096)

	Radius						
	2 km	**5 km**	**6.5 km**	**16 km**	**35 km**	**50 km**	**80 km**
Land Area (km²)	7	49	79	498	2 287	4 740	11 004
2018							
No. of People	0	6 720	9 120	143 380	1 710 950	4 279 170	5 128 040
Density (people/km²)	**0**	**137**	**115**	**288**	**748**	**903**	**466**
2026							
No. of People	0	8 830	13 850	184 480	2 070 820	5 089 400	6 134 620
Density (people/km²)	**0**	**180**	**175**	**370**	**906**	**1 074**	**558**
2046							
No. of People	0	12 970	20 770	285 700	3 114 550	7 169 430	8 682 380
Density (people/km²)	**0**	**265**	**263**	**574**	**1 362**	**1 513**	**789**
2096							
No. of People	0	34 900	47 070	777 750	9 339 050	17 776 670	21 594 510
Density (people/km²)	**0**	**712**	**596**	**1 562**	**4 084**	**3 750**	**1 962**

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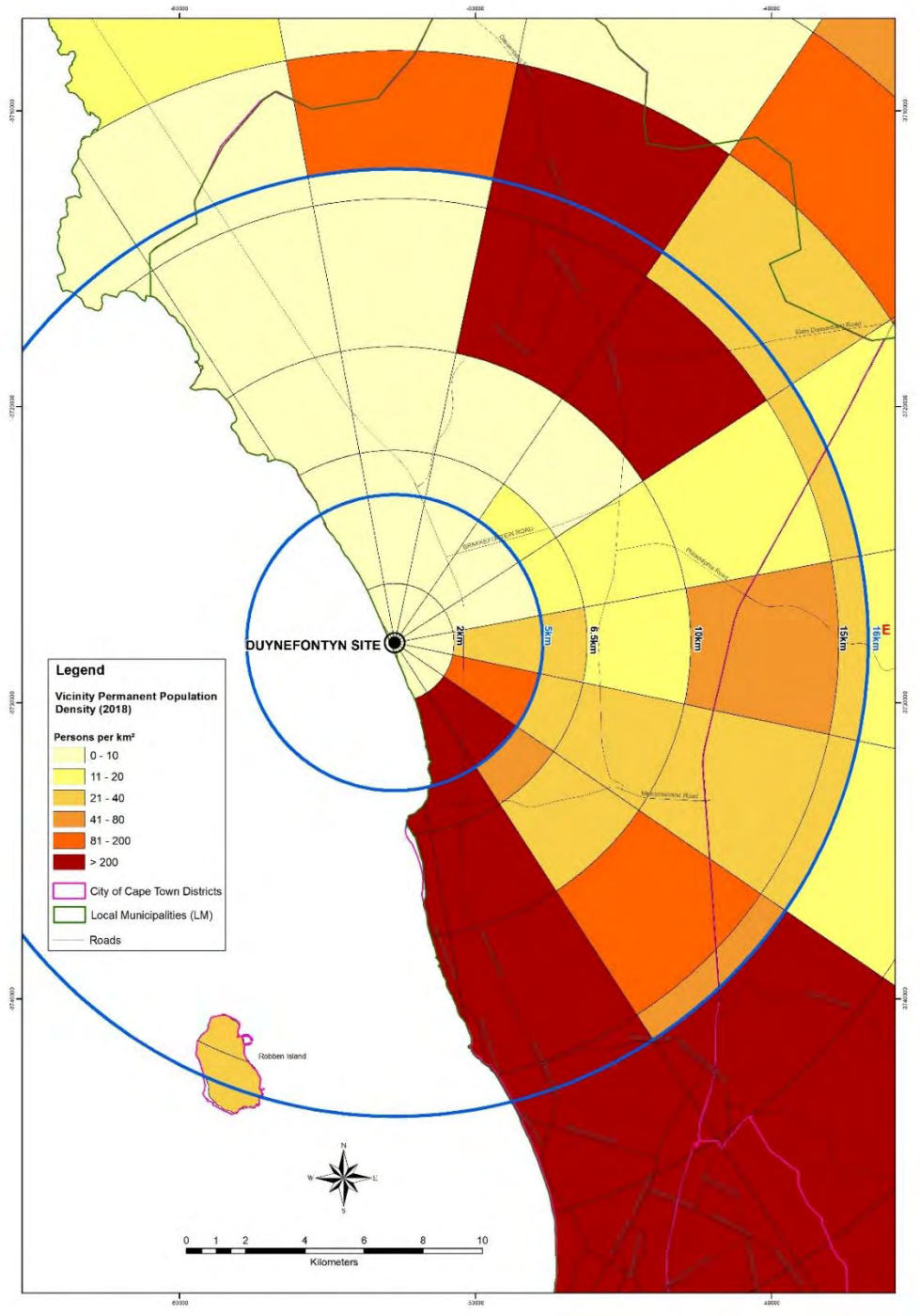


Figure 5.4.16
Projected Vicinity Permanent Population Density (2018)

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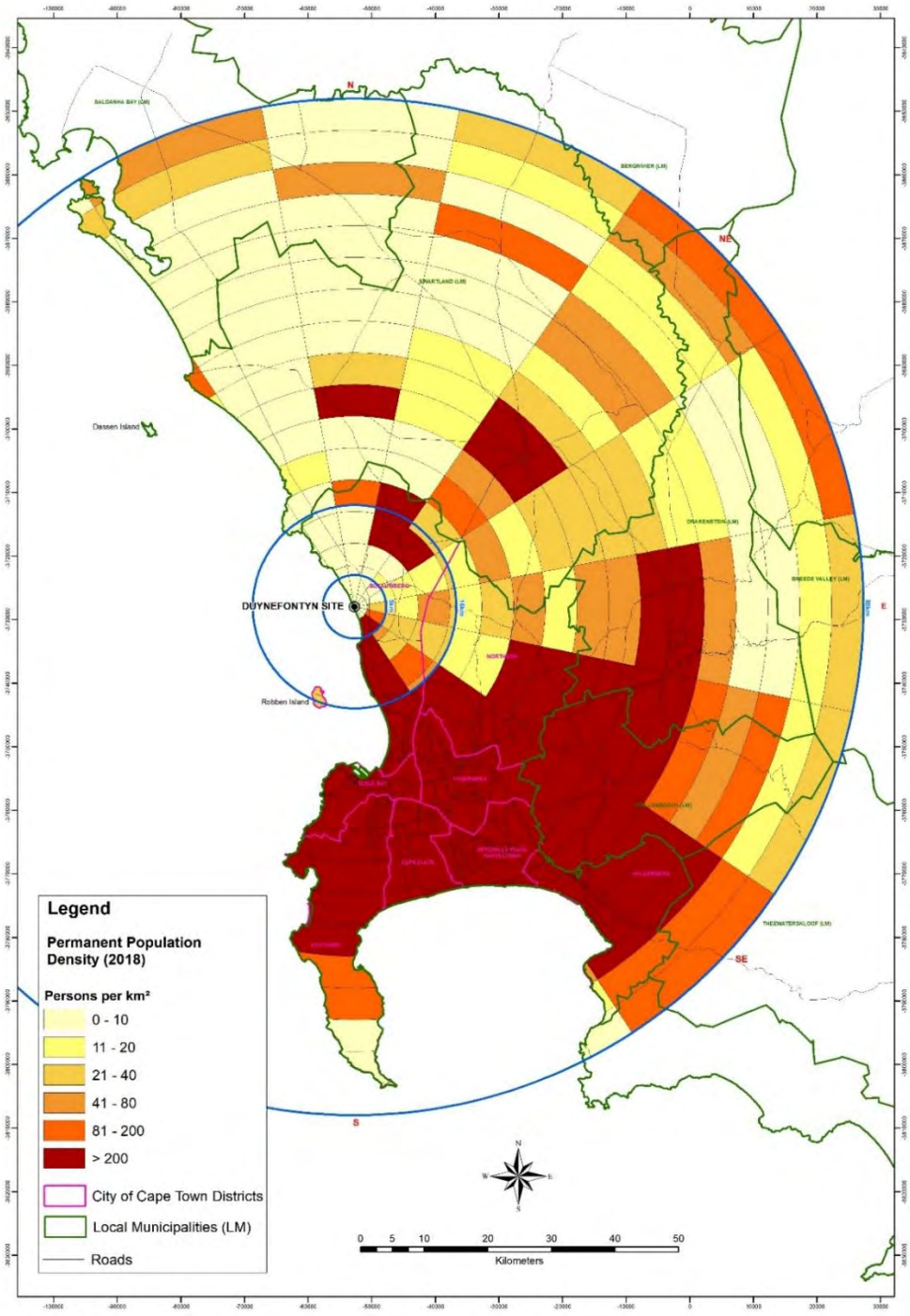


Figure 5.4.17
Projected Regional Permanent Population Density (2018)

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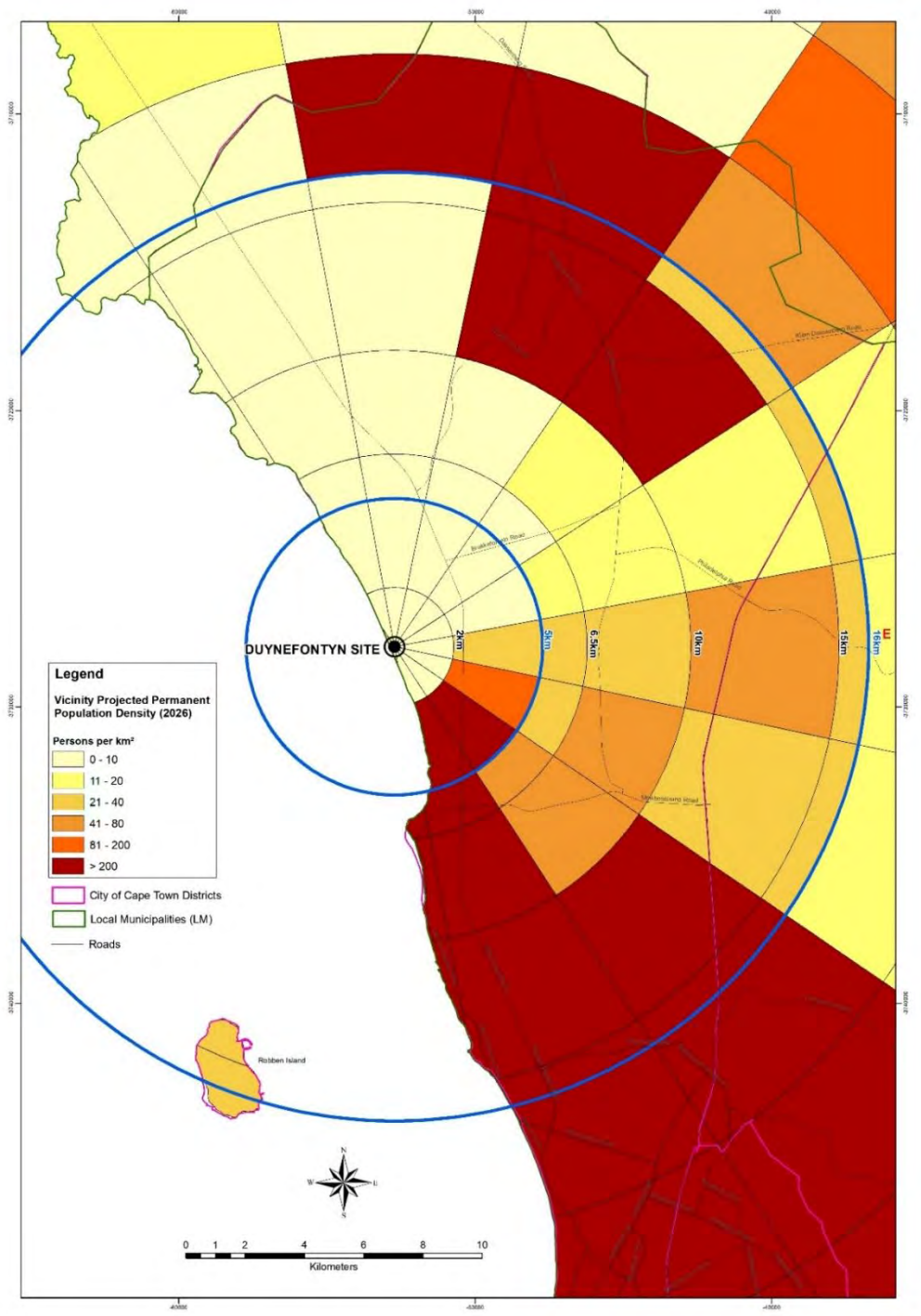


Figure 5.4.18
Projected Vicinity Permanent Population Density (2026)

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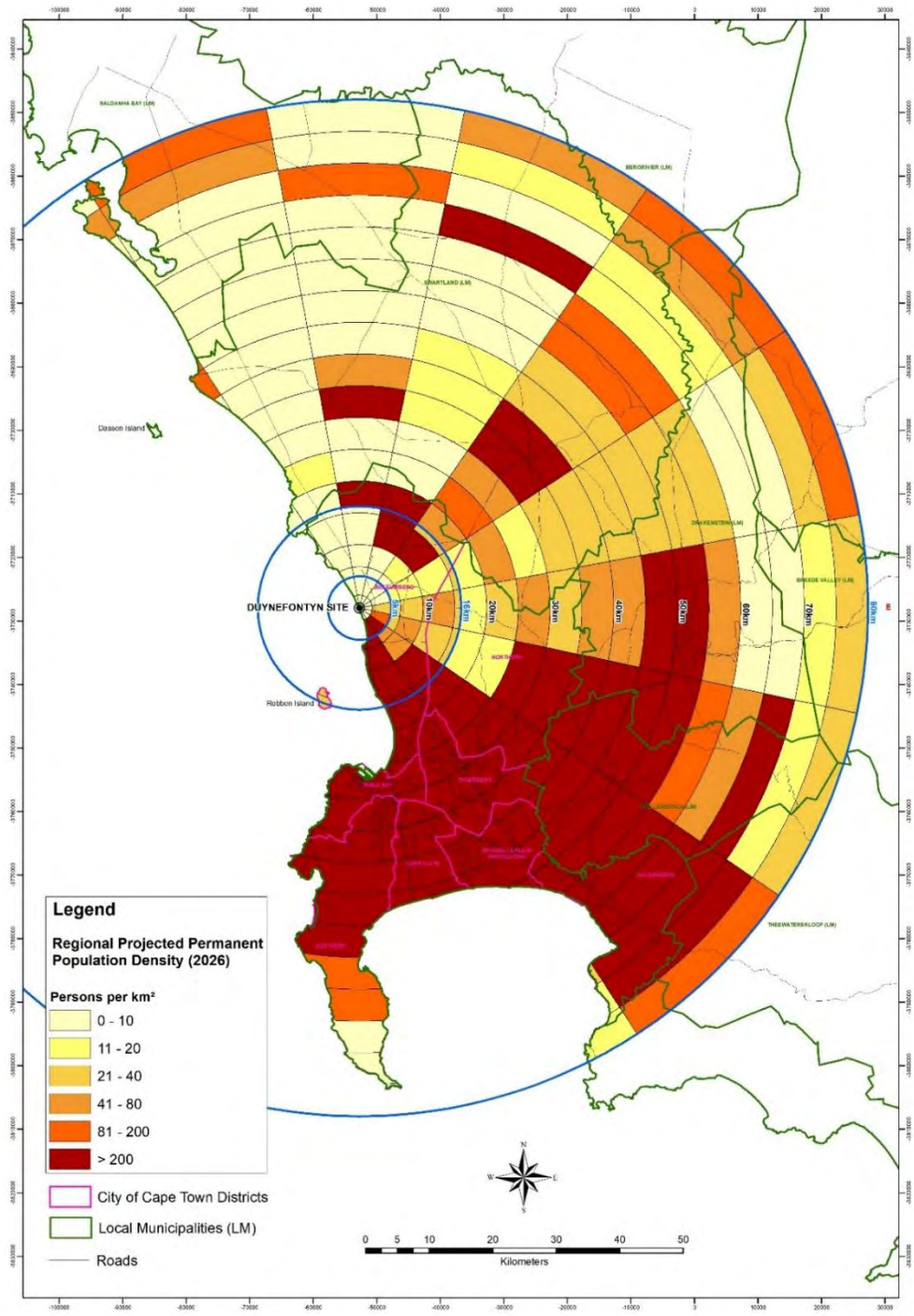


Figure 5.4.19
Projected Regional Permanent Population Density (2026)

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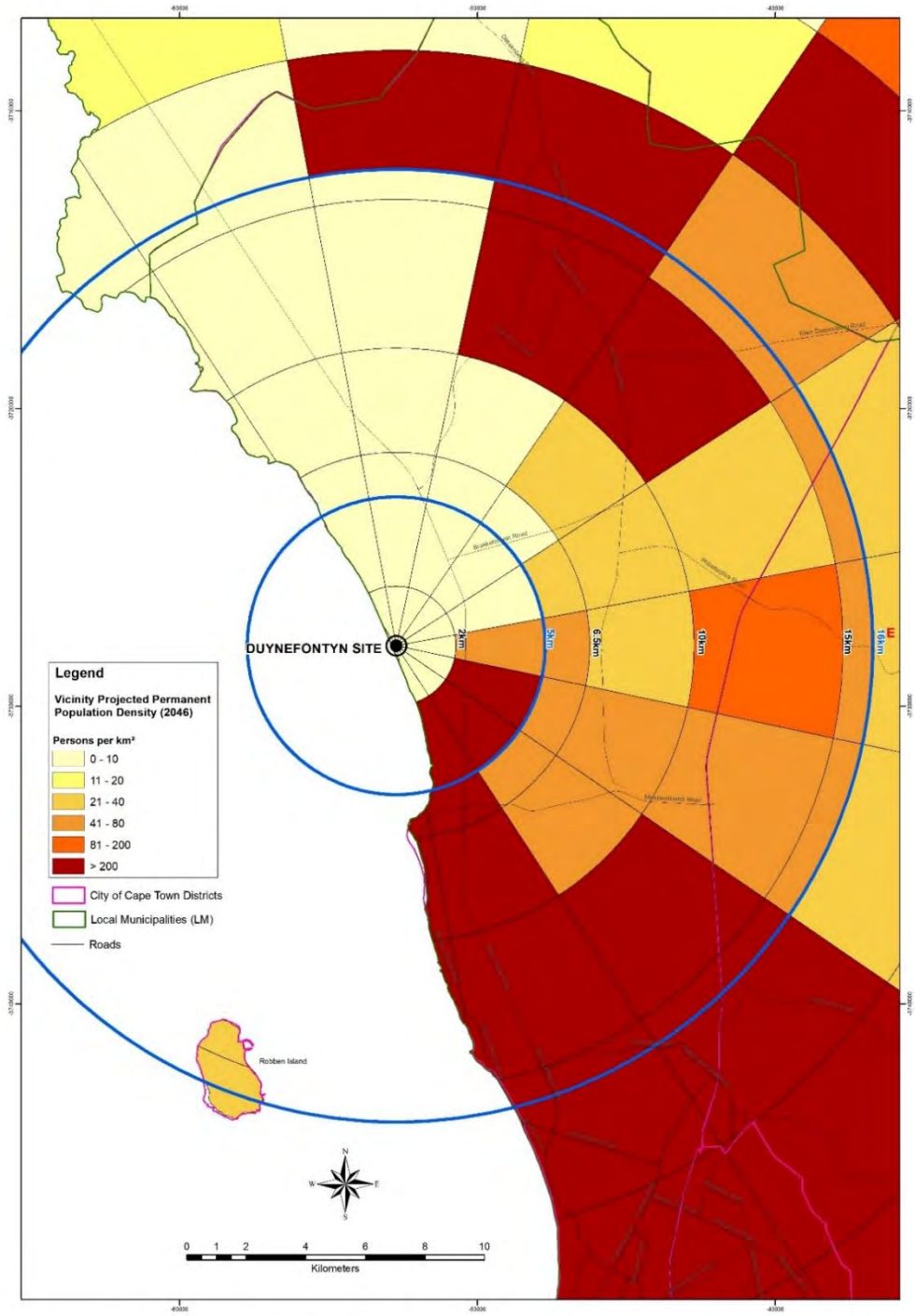


Figure 5.4.20
Projected Vicinity Permanent Population Density (2046)

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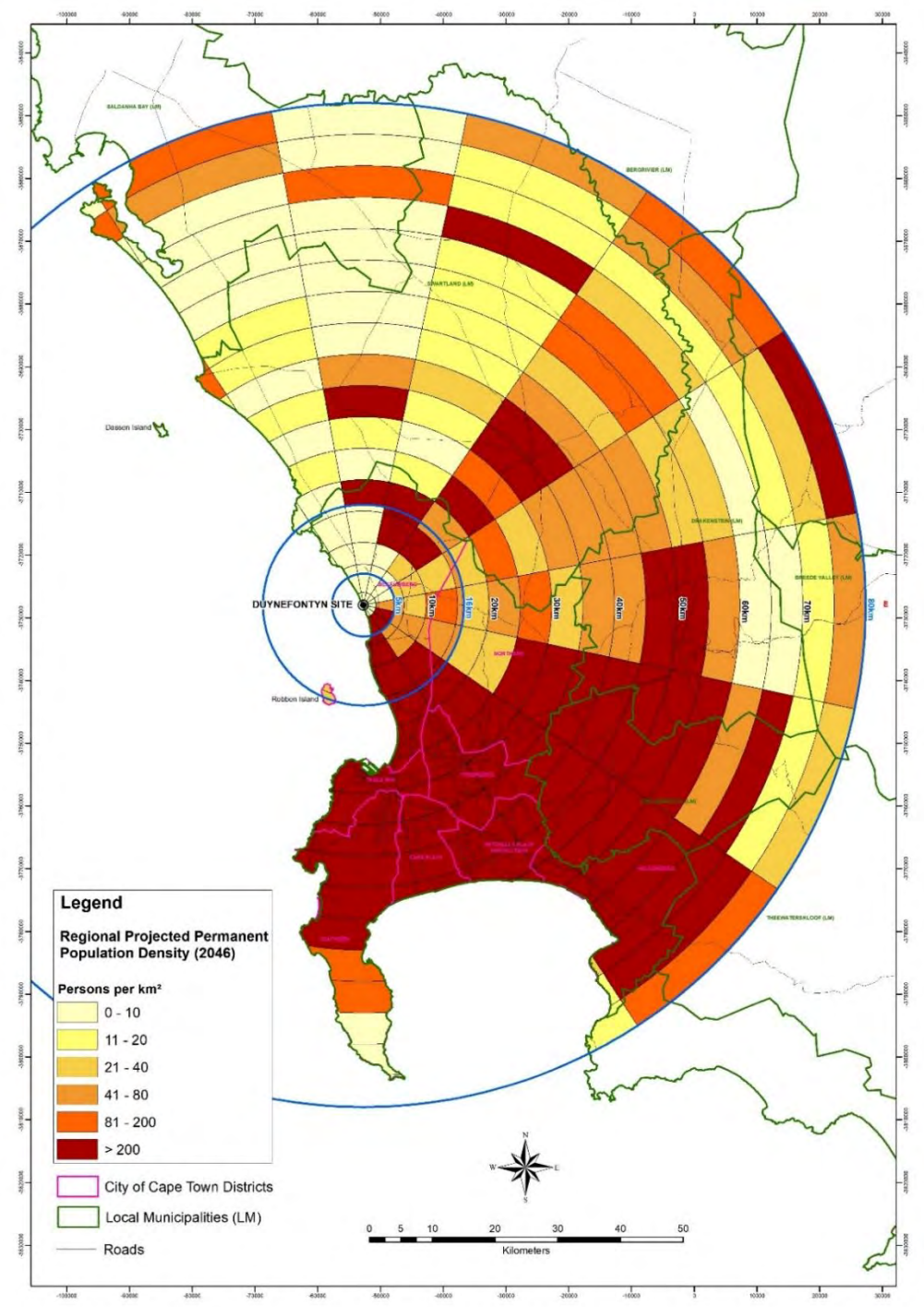


Figure 5.4.21
Projected Regional Permanent Population Density (2046)

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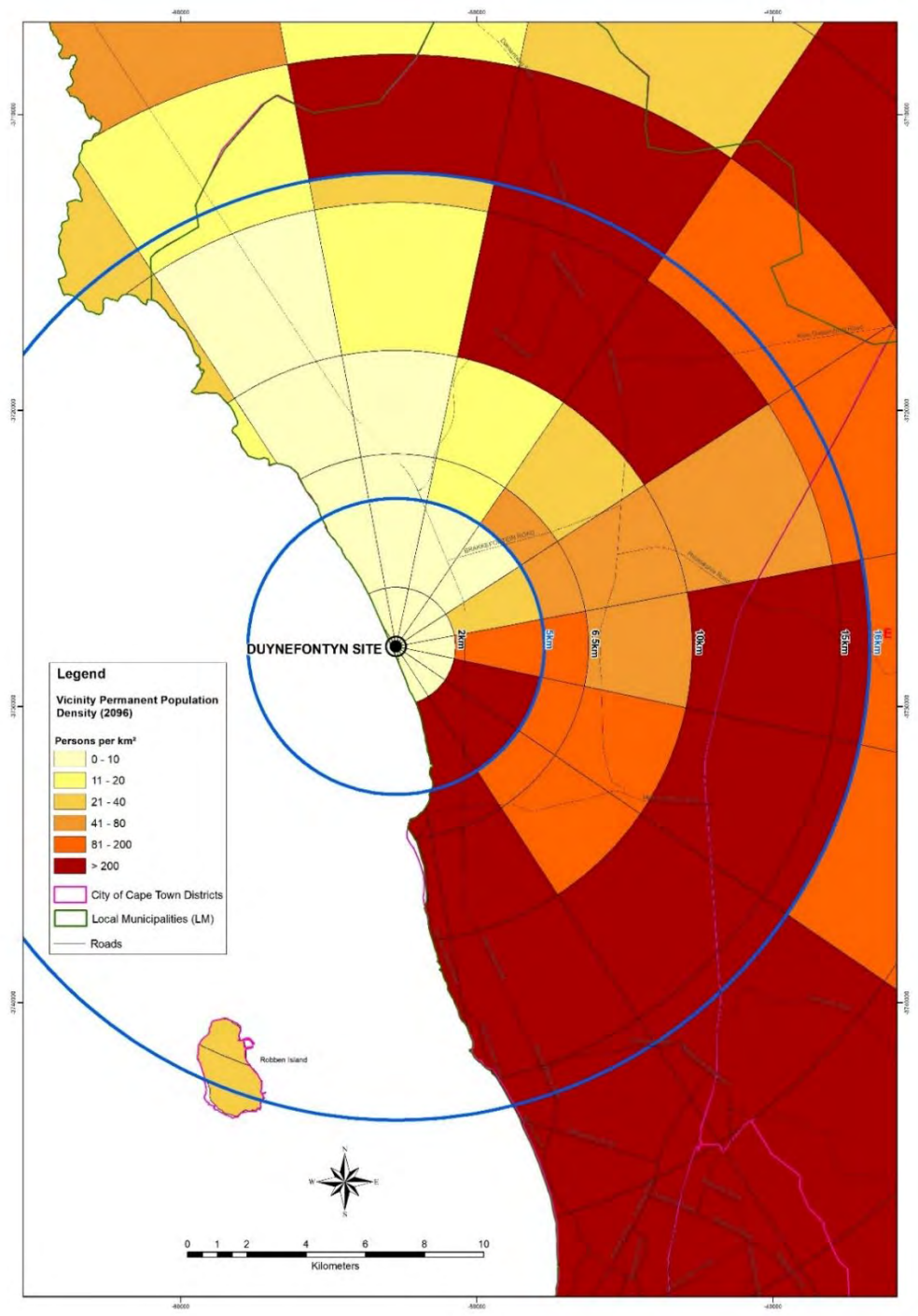


Figure 5.4.22
Projected Vicinity Permanent Population Density (2096)

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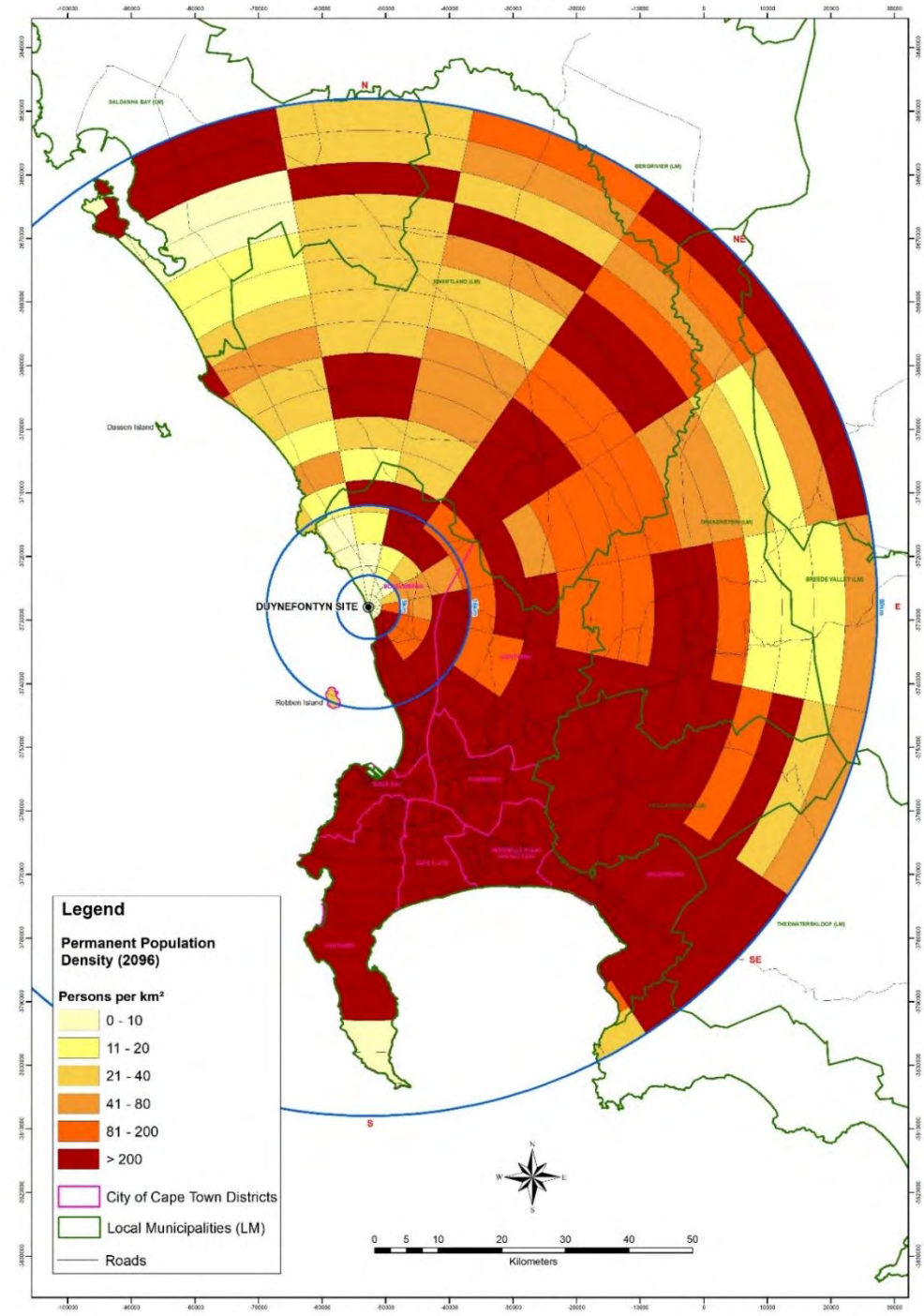


Figure 5.4.23
Projected Regional Permanent Population Density (2096)

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5.4.8.3 Population Centres

Population centres have been analysed in order to determine whether they exceed the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) contained in ***Subsection 5.4.3.2*** (Guideline Documents). In this regard, emphasis is placed on the benchmark of a density of approximately 200 persons/km² and not the size of the population centre as a large portion within the 80 km radius consists of ocean, i.e. does not contain residents. Please note that the referenced documents act only as a guide and are not an NNR requirement.

The following indicates the estimated population numbers in 2018, 2026, 2046 and 2096 with respect to various annuli within 80 km from the site centroid as extracted from the results of the analysis:

- **6.5 km Radius**

  The neighbourhoods of Duynefontein, Van Riebeeckstrand and a portion of Melkbosstrand form the largest settlement located within 6.5 km of the site and is estimated to have a combined total of approximately 7 850 persons in 2018, approximately 13 150 persons in 2026, approximately 19 840 persons in 2046 and approximately 41 750 persons by 2096.

  The total population within the 6.5 km radius is estimated to be approximately 9 120 persons in 2018, approximately 13 850 persons in 2026, approximately 20 770 persons in 2046 and approximately 47 070 persons by 2096.

- **16 km Radius**

  The town of Atlantis (7.5 km to 16 km north-northeast) is the largest populated area within the 16 km radius and is estimated to have a population of approximately 87 430 persons in 2018, approximately 98 210 persons in 2026, approximately 144 560 persons in 2046 and approximately 389 110 persons by 2096.

  The total population within the 16 km radius is estimated to be approximately 143 380 persons in 2018, approximately

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184 480 persons in 2026, approximately 285 700 persons in 2046 and approximately 777 750 persons by 2096.

- **35 km Radius**

  Urban portions of the City of Cape Town located 10 to 35 km towards the south, south-southeast, southeast and east-southeast form the largest populated area within the 35 km radius and is estimated to have a population of approximately 1 039 340 persons in 2018, approximately 1 826 280 persons in 2026, approximately 2 736 120 persons in 2046 and approximately 5 773 581 persons by 2096.

  The total population within the 35 km radius is estimated to be approximately 1 710 950 persons in 2018, approximately 2 070 820 persons in 2026, approximately 3 114 550 persons in 2046 and approximately 9 339 050 persons by 2096.

- **50 km Radius**

  Urban portions of the City of Cape Town located 10 to 50 km towards the south, south-southeast, southeast and east-southeast form the largest populated area within the 50 km radius and is estimated to have a population of approximately 3 868 970 persons in 2018, approximately 4 598 280 persons in 2026, approximately 6 433 580 persons in 2046 and approximately 15 770 110 persons by 2096.

  The total population within the 50 km radius is estimated to be approximately 4 279 170 persons in 2018, approximately 5 089 400 persons in 2026, approximately 7 169 430 persons in 2046 and approximately 17 776 670 persons by 2096.

- **80 km Radius**

  Urban portions of the City of Cape Town located 10 to 75 km towards the south, south-southeast, southeast and east-southeast form the largest populated area within the 80 km radius and is estimated to have a population of approximately 4 219 690 persons in 2018, approximately 5 033 660 persons in 2026, approximately 7 097 130 persons in 2046 and approximately 17 689 770 persons by 2096.

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The total population within the 80 km radius is estimated to be approximately 5 128 040 persons in 2018, approximately 6 134 620 persons in 2026, approximately 8 682 380 persons in 2046 and approximately 21 594 510 persons by 2096.

The population projections indicate that the site conforms to the abovementioned international guidance for the 6.5 km radius in 2018 and 2026.

Based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection), the site may possibly not conform to these guidelines for the 6.5 km radius in 2046 and 2096 and the 16 km, 35 km and 50 km radii for 2018, 2026, 2046 and 2096. Please note that the referenced documents act only as a guide and are not an NNR requirement.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated in the City of Cape Town Municipal Spatial Development Framework (2023) (City of Cape Town, 2023a), the Blaauwberg District Spatial Development Framework (2023) (City of Cape Town, 2023b) and the City of Cape Town Municipal Planning By-Law, 2015 (City of Cape Town, 2015) with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

5.4.8.4 Tourist Population Projection

The tourist population has been estimated in five-year intervals from 2018 to 2096 within 80 km from the nuclear installation(s) (Eskom, 2014) **(Eskom, 2022b)**.

As the tourism figures were not available per local municipality, Enumerated Areas, Small Areas or Sub-places, the total tourist population has been distributed within each of the sectors around the nuclear installation(s) as a ratio of the permanent population in that sector as indicated in ***Subsection 5.4.6.4*** (Tourist Population)[11].

The tourist population estimation and distribution for any one day in the peak month within 80 km from the nuclear installation(s) are presented in

[11] The tourist population ratio per permanent population, as indicated in ***Table 5.4.12***, was applied to each sector for a specific year.

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Appendix 5.4.N and for 2096 in ***Drawings 5.4.17*** and ***5.4.18*** below.

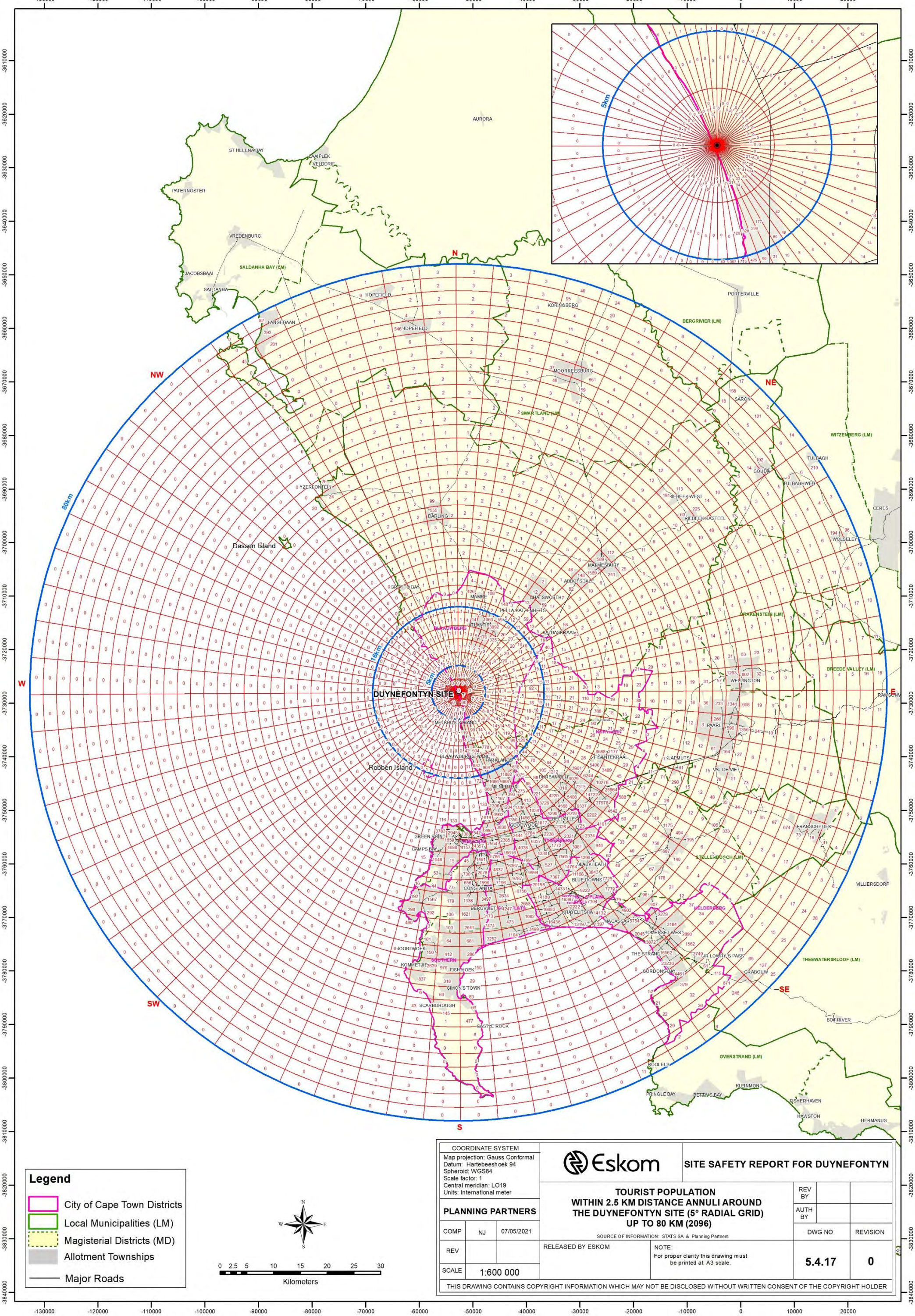
The total number of tourists within the 80 km radius around the Duynefontyn site on any one day in the peak month (i.e. December) has been estimated (upper estimate) to be approximately:

- 191 750 tourists in 2018;
- 228 040 tourists in 2026;
- 322 150 tourists in 2046;
- 805 600 tourists by 2096.

As also noted in ***Subsection 5.4.6.4*** (Tourist Population), it could however be expected that certain sectors would have a larger tourist concentration on any given day, as they contain tourism destinations/nodes (e.g. V&A Waterfront, Table Mountain, Cape Point, etc.) and that other sectors (e.g. resident population's residential areas) would have a lower tourist concentration at any one time. Many destinations are also weather dependant, which would impact on visitor numbers on a daily basis (e.g. beaches, Table Mountain, etc.).

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- Magisterial Districts (MD)
- Allotment Townships
- Major Roads

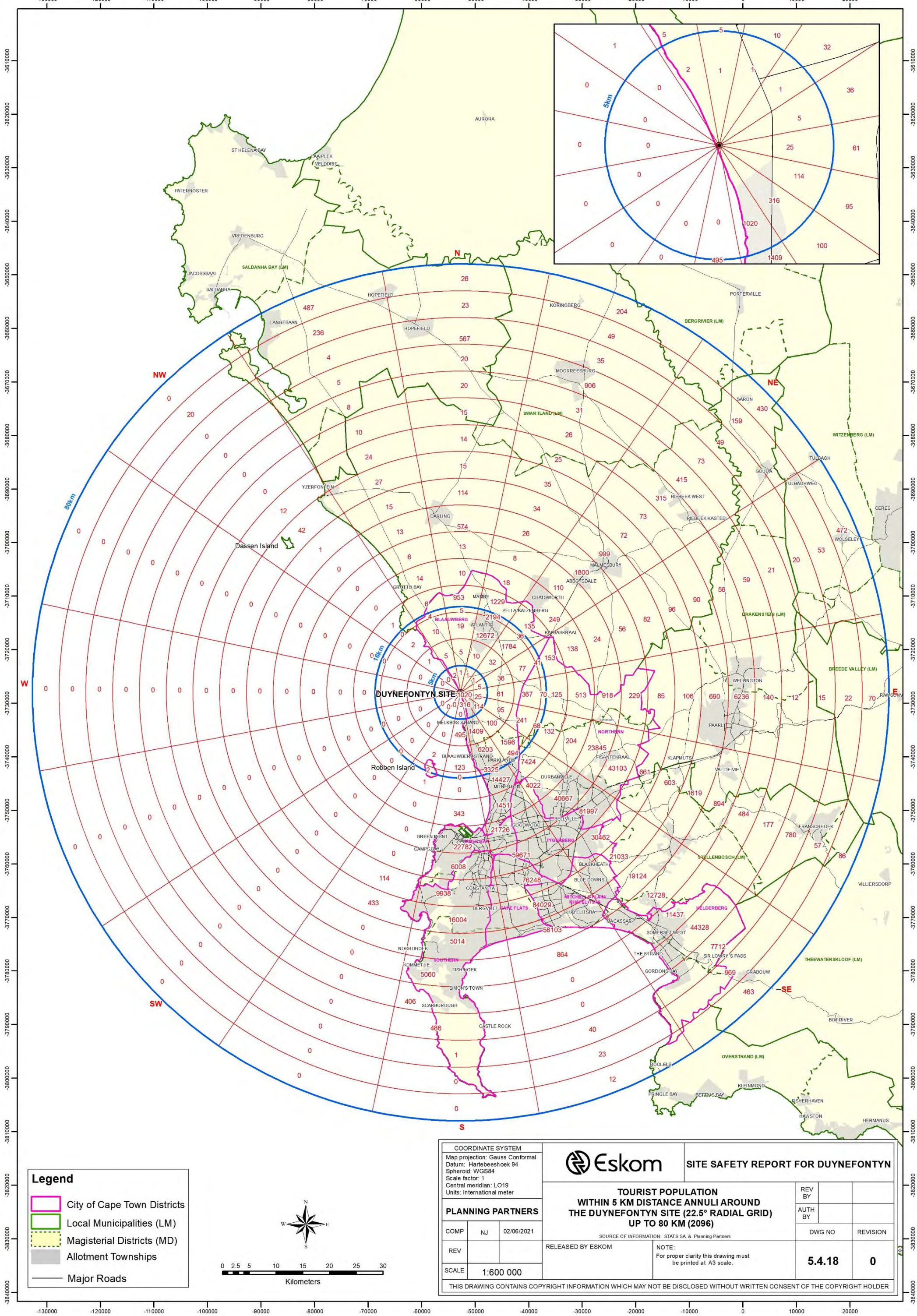
N, W, E, S

0 2.5 5 10 15 20 25 30

Kilometers

COORDINATE SYSTEM	Eskom — SITE SAFETY REPORT FOR DUYNEFONTYN
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter	**TOURIST POPULATION WITHIN 2.5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (5° RADIAL GRID) UP TO 80 KM (2096)** SOURCE OF INFORMATION: STATS SA & Planning Partners
PLANNING PARTNERS	REV BY:
COMP: NJ 07/05/2021	AUTH BY:
REV:	DWG NO: 5.4.17 — REVISION: 0
SCALE: 1:600 000	RELEASED BY ESKOM — NOTE: For proper clarity this drawing must be printed at A3 scale.

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Legend

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- Allotment Townships
- Major Roads

0 2.5 5 10 15 20 25 30
Kilometers

COORDINATE SYSTEM	Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter	TOURIST POPULATION WITHIN 5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (22.5° RADIAL GRID) UP TO 80 KM (2096) SOURCE OF INFORMATION: STATS SA & Planning Partners	REV BY AUTH BY
PLANNING PARTNERS		DWG NO: 5.4.18 / REVISION: 0
COMP NJ 02/06/2021		
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5.4.9 Total Cumulative Population Distribution

The total cumulative population has been estimated from 2018 to 2096 and characterised for the site vicinity of 16 km and the site region of 80 km around the nuclear installation(s) (Eskom, 2014) **(Eskom, 2022b)**.

The assessment includes the estimated total cumulative population in five-year intervals for the lifetime of the nuclear installation(s).

5.4.9.1 Total Cumulative Population

In order to determine the maximum number of persons within the 80 km radius around the nuclear installation(s), referred to as the total cumulative population, the tourist population on any one day in the peak month needs to be added to the permanent population. Within the 80 km radius, it was estimated that:

- the permanent population was estimated to be approximately 5 128 040 persons in 2018;
- the permanent population is projected to be approximately 6 134 620 persons by 2026;
- the permanent population is projected to be approximately 8 682 380 persons by 2046;
- the permanent population is projected to be approximately 21 594 510 persons by 2096;
- the total tourist population was estimated to be approximately 191 750 tourists in 2018 on any one day during the peak tourism month, i.e. December;
- the total tourist population is estimated to be approximately 228 040 tourists by 2026 on any one day during the peak tourism month;
- the total tourist population is estimated to be approximately 322 150 tourists by 2046 on any one day during the peak tourism month
- the total tourist population is estimated to be approximately 805 600 tourists by 2096 on any one day during the peak tourism

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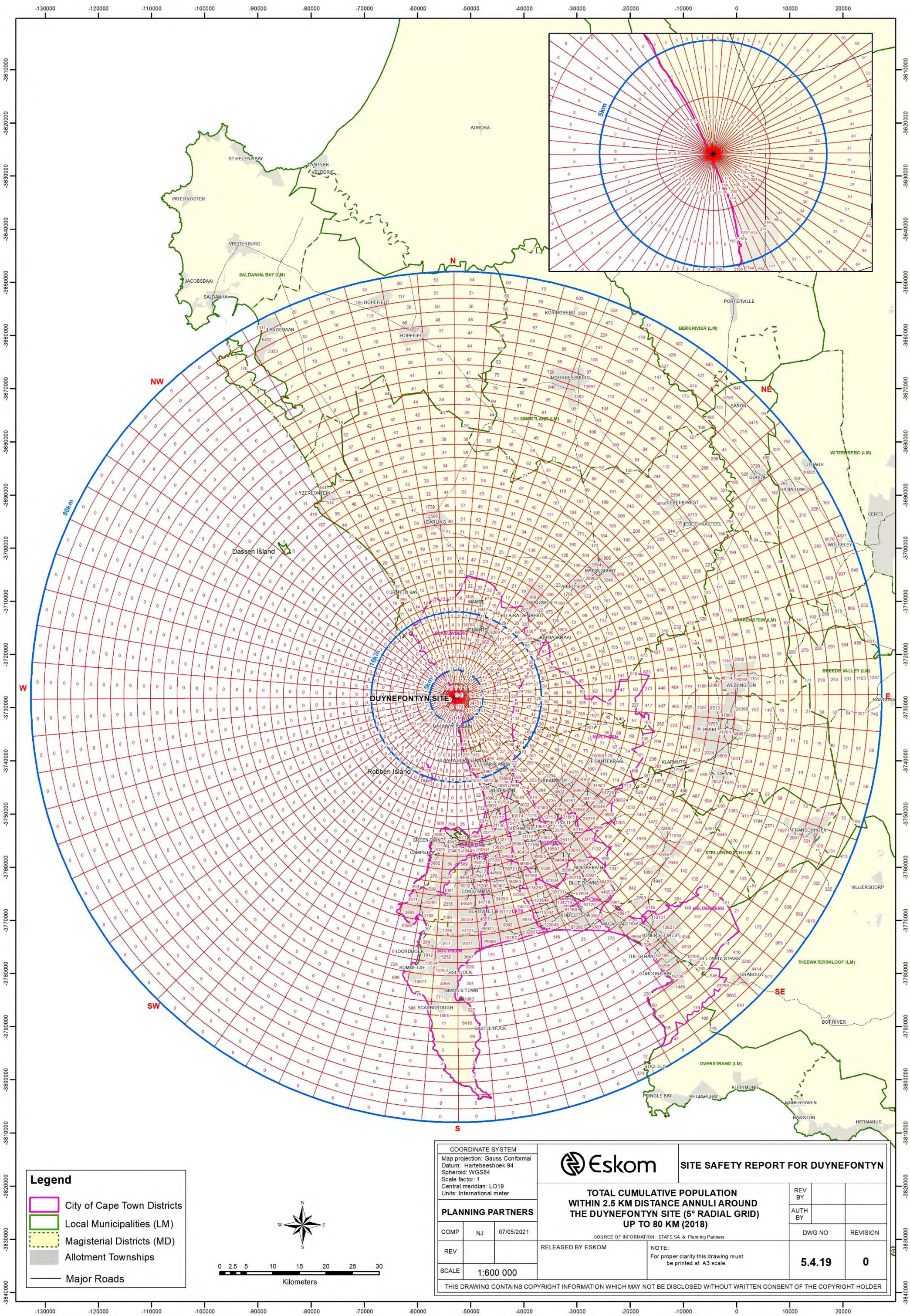
month.

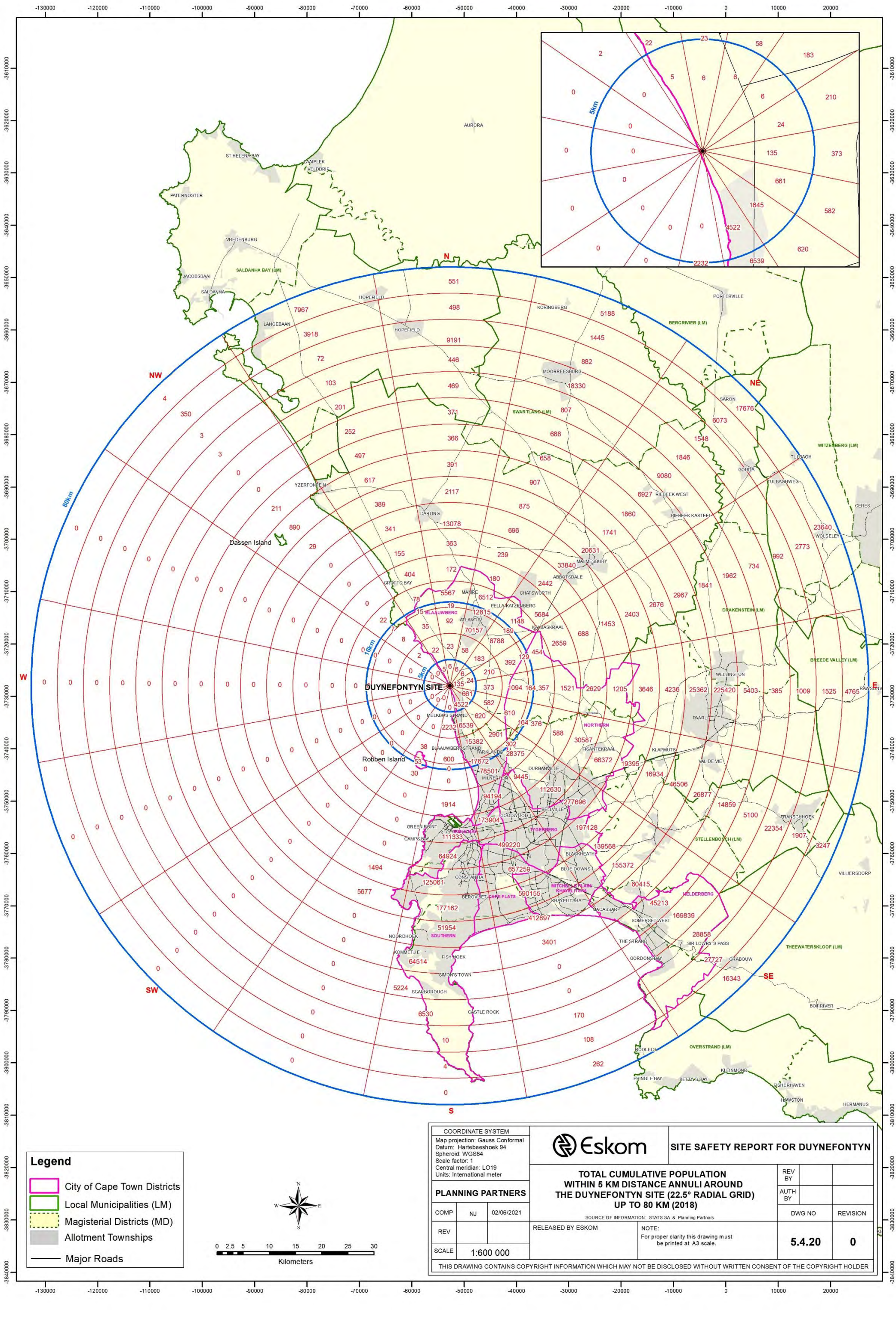
On the basis of the above mentioned data, the total cumulative population distribution was estimated in five-year intervals from 2018 to 2096 within 80 km from the nuclear installation(s). The results are presented in ***Appendices 5.4.O*** and ***5.4.P***, ***Drawings 5.4.19*** to ***5.4.22*** and ***Figures 5.4.24*** to ***5.4.29*** below. The total cumulative population estimates within the 80 km radius around the nuclear installation(s) indicate, *inter alia,* approximately:

- 5 319 790 persons in 2018;
- 6 362 660 persons in 2026;
- 9 004 530 persons in 2046;
- 22 400 120 persons by 2096.

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DUYNEFONTYN SITE
5km
16km
80km
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SW
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NW
AURORA
ST HELENA BAY
LAAIPLEK
VELDDRIF
PATERNOSTER
VREDENBURG
SALDANHA BAY (LM)
JACOBSBAAI
SALDANHA
HOPEFIELD
LANGEBAAN
PORTERVILLE
KORINGBERG
BERGRIVIER (LM)
MOORREESBURG
SWARTLAND (LM)
SARON
WITZENBERG (LM)
TULBAGH
GOUDA
TULBAGHWEG
YZERFONTEIN
DARLING
HEBEEK-WEST
HEBEEK-KASTEEL
CERES
WOLSELEY
Dassen Island
MAMRE
ATLANTIS
KALBASKRAAL
DRAKENSTEIN (LM)
BREEDE VALLEY (LM)
WELLINGTON
PAARL
RAWSONV
Robben Island
PARKLANDS
TABLE VIEW
URBANVILLE
BELLVILLE
GOODWOOD
KLAPMUTS
VAL DE VIE
FRANSCHHOEK
STELLENBOSCH (LM)
VILLIERSDORP
GREEN POINT
CAMPS BAY
CONSTANTIA
BLUE DOWNS
BERGVLIET
KHAYELITSHA
MACASSAR
SOMERSET WEST
HELDERBERG
KOMMETJIE
SIMON'S TOWN
SCARBOROUGH
CASTLE ROCK
THE STRAND
GORDONS BAY
GRABOUW
THEEWATERSKLOOF (LM)
BOT RIVER
OVERSTRAND (LM)
KLEINMOND
PRINGLE BAY
BETTY'S BAY
FISHERHAVEN
HAWSTON
HERMANUS
Legend
City of Cape Town Districts
Local Municipalities (LM)
Magisterial Districts (MD)
Allotment Townships
Major Roads
0 2.5 5 10 15 20 25 30
Kilometers
COORDINATE SYSTEM
Map projection: Gauss Conformal
Datum: Hartebeeshoek 94
Spheroid: WGS84
Scale factor: 1
Central meridian: LO19
Units: International meter
PLANNING PARTNERS
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REV
SCALE 1:600 000
Eskom
SITE SAFETY REPORT FOR DUYNEFONTYN
TOTAL CUMULATIVE POPULATION
WITHIN 2.5 KM DISTANCE ANNULI AROUND
THE DUYNEFONTYN SITE (5° RADIAL GRID)
UP TO 80 KM (2018)
SOURCE OF INFORMATION: STATS SA & Planning Partners
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AUTH BY
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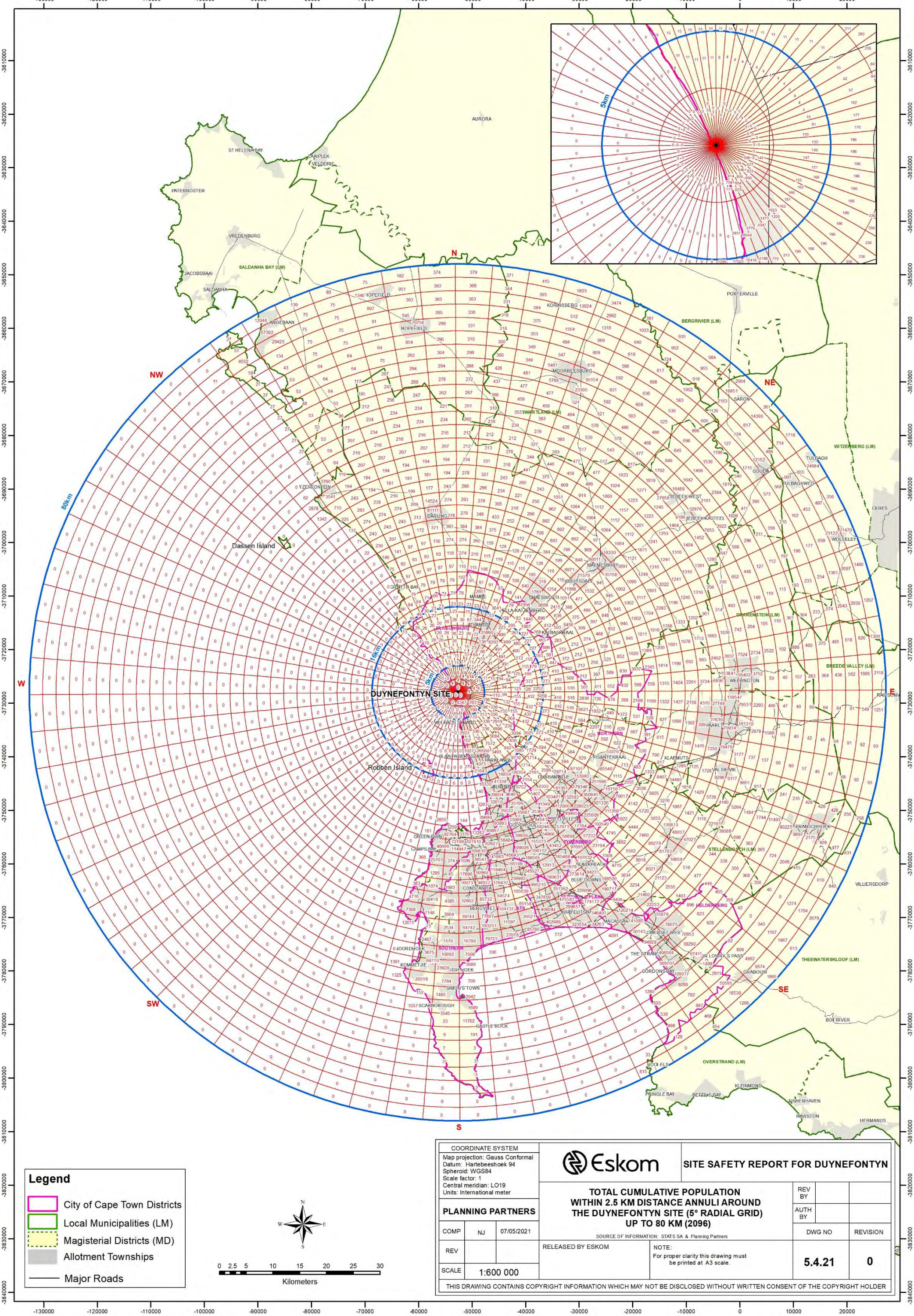
Legend

- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships
- Major Roads

0 2.5 5 10 15 20 25 30
Kilometers

COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter	Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN
PLANNING PARTNERS	TOTAL CUMULATIVE POPULATION WITHIN 5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (22.5° RADIAL GRID) UP TO 80 KM (2018) SOURCE OF INFORMATION: STATS SA & Planning Partners	REV BY / AUTH BY
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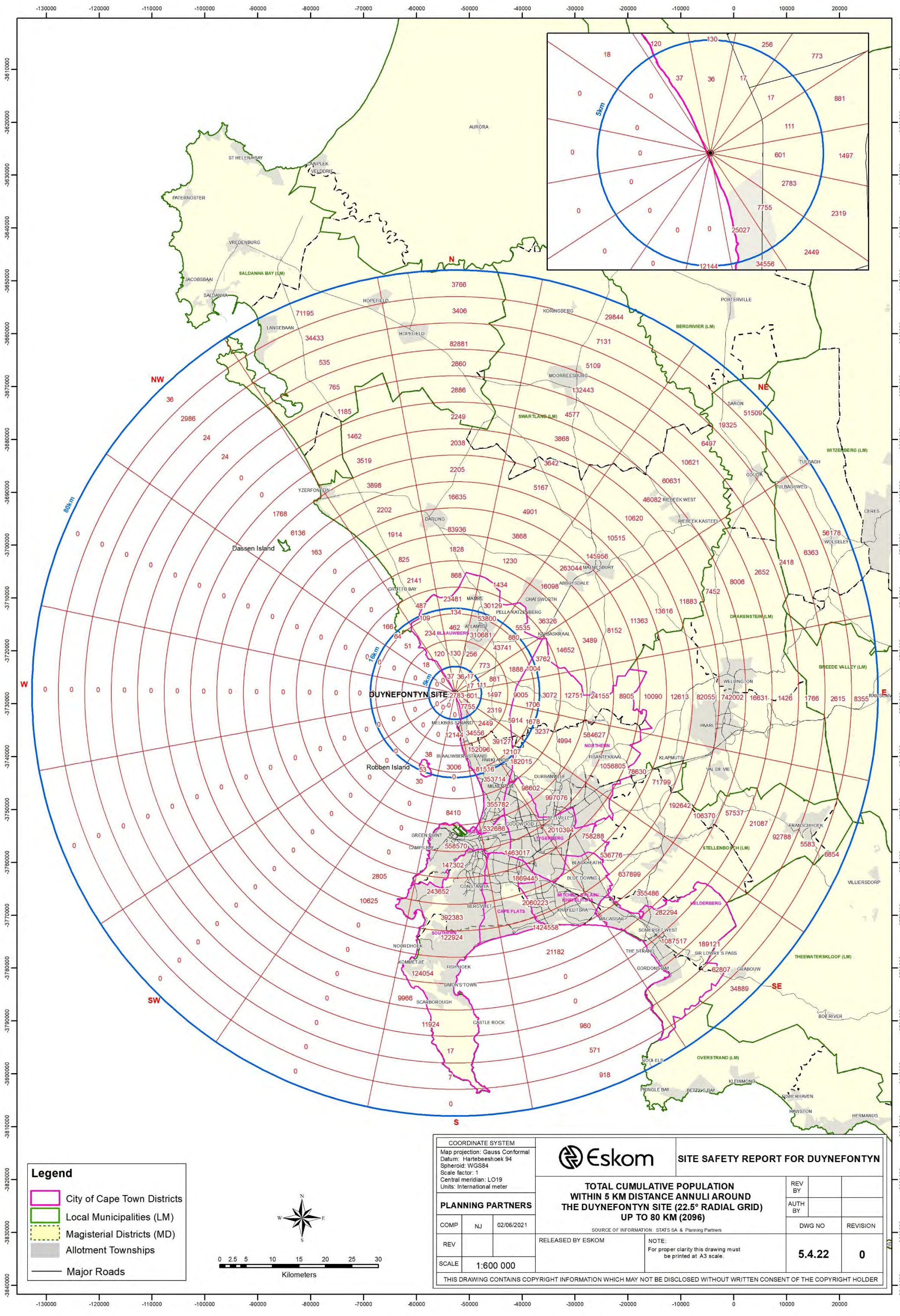


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COORDINATE SYSTEM			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			TOTAL CUMULATIVE POPULATION WITHIN 2.5 KM DISTANCE ANNULI AROUND THE DUYNEFONTYN SITE (5° RADIAL GRID) UP TO 80 KM (2096) SOURCE OF INFORMATION: STATS SA & Planning Partners	REV BY		
PLANNING PARTNERS				AUTH BY		
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DUYNEFONTYN SITE
5km
16km
80km
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S
SW
W
NW
AURORA
ST HELENABAY
LAAIPLEK
VELDDRIF
PATERNOSTER
VREDENBURG
SALDANHA BAY (LM)
JACOBSBAAI
SALDANHA
LANGEBAAN
HOPEFIELD
PORTERVILLE
BERGRIVIER (LM)
KORINGBERG
MOORREESBURG
SWARTLAND (LM)
SARON
WITZENBERG (LM)
TULBAGH
GOUDA
TULBAGHWEG
RIEBEEK WEST
RIEBEEK KASTEEL
CERES
WOLSELEY
YZERFONTEIN
DARLING
Dassen Island
GROTTO BAY
MAMRE
CHATSWORTH
PELLA/KATZENBERG
ATLANTIS
BLAAUWBERG
KAHBASKRAAL
MALMESBURY
ABBOTSDALE
DRAKENSTEIN (LM)
BREEDE VALLEY (LM)
WELLINGTON
PAARL
MELKBOS STRAND
BLAAUWBERGSTRAND
PARKLANDS
Robben Island
NORTHERN
FISANTEKRAAL
KLAPMUTS
VAL DE VIE
DURBANVILLE
MILNERTON
BELLVILLE
GOODWOOD
GREEN POINT
CAMPS BAY
TYGERBERG
STELLENBOSCH (LM)
FRANSCHHOEK
VILLIERSDORP
BLACKHEATH
BLUE DOWNS
CONSTANTIA
MITCHELL'S PLAIN/ KHAYELITSHA
HELDERBERG
BERGVLIET
CAPE FLATS
KHAYELITSHA
MACASSAR
SOMERSET WEST
SOUTHERN
NOORDHOEK
KOMMETJIE
FISH HOEK
SIMON'S TOWN
SCARBOROUGH
CASTLE ROCK
THE STRAND
GORDONS BAY
SIR LOWRY'S PASS
GRABOUW
THEEWATERSKLOOF (LM)
BOT RIVER
OVERSTRAND (LM)
ROOI-ELS
PRINGLE BAY
BETTY'S BAY
KLEINMOND
FISHERHAVEN
HAWSTON
HERMANUS
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City of Cape Town Districts
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0 2.5 5 10 15 20 25 30
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Scale factor: 1
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Units: International meter
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SCALE 1:600 000
Eskom
SITE SAFETY REPORT FOR DUYNEFONTYN
TOTAL CUMULATIVE POPULATION
WITHIN 5 KM DISTANCE ANNULI AROUND
THE DUYNEFONTYN SITE (22.5° RADIAL GRID)
UP TO 80 KM (2096)
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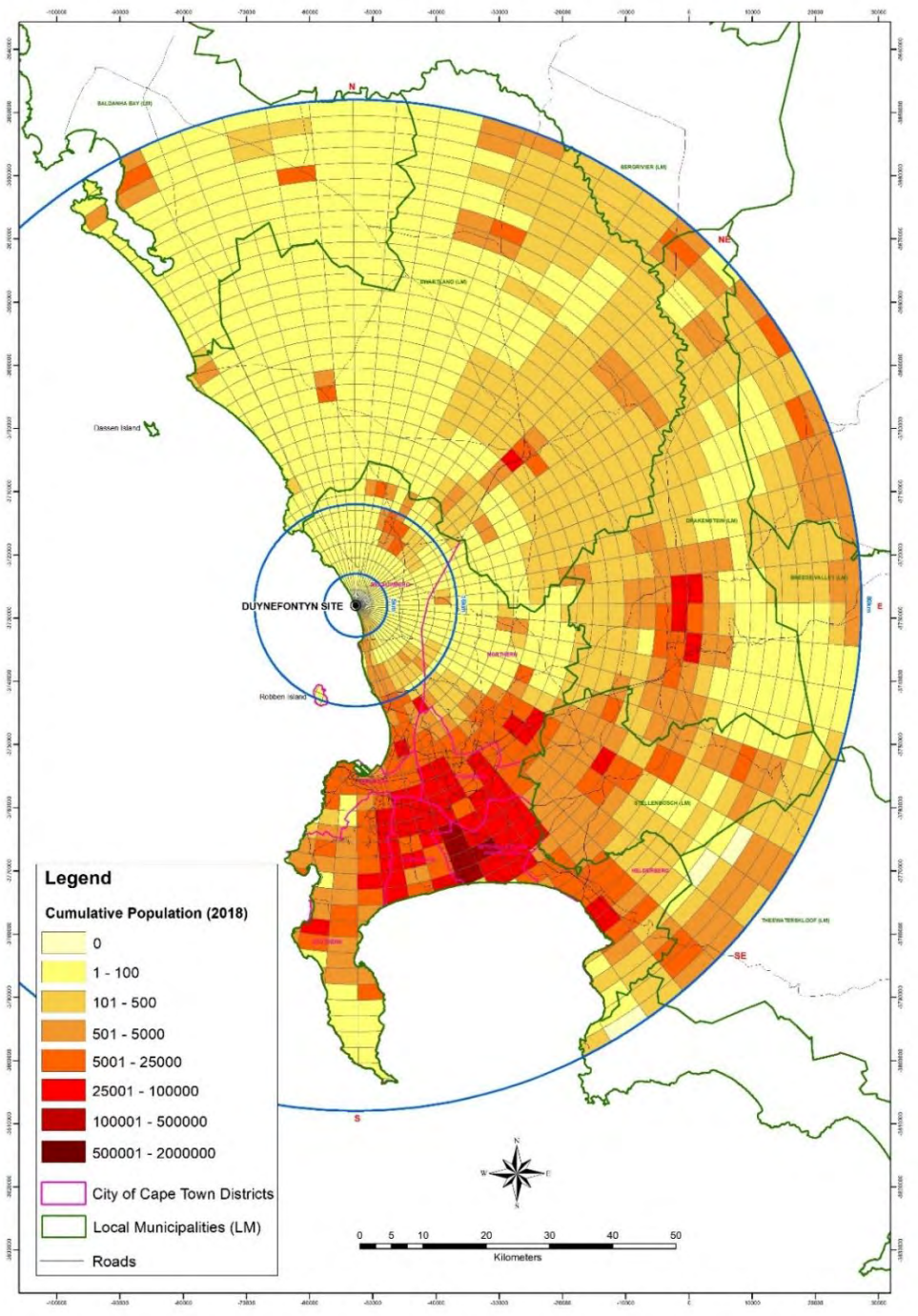


Figure 5.4.24
Total Cumulative Population Within 2.5 km Distance Annuli Around the Duynefontyn Site (5° Radial Grid) up to 80 km (2018)

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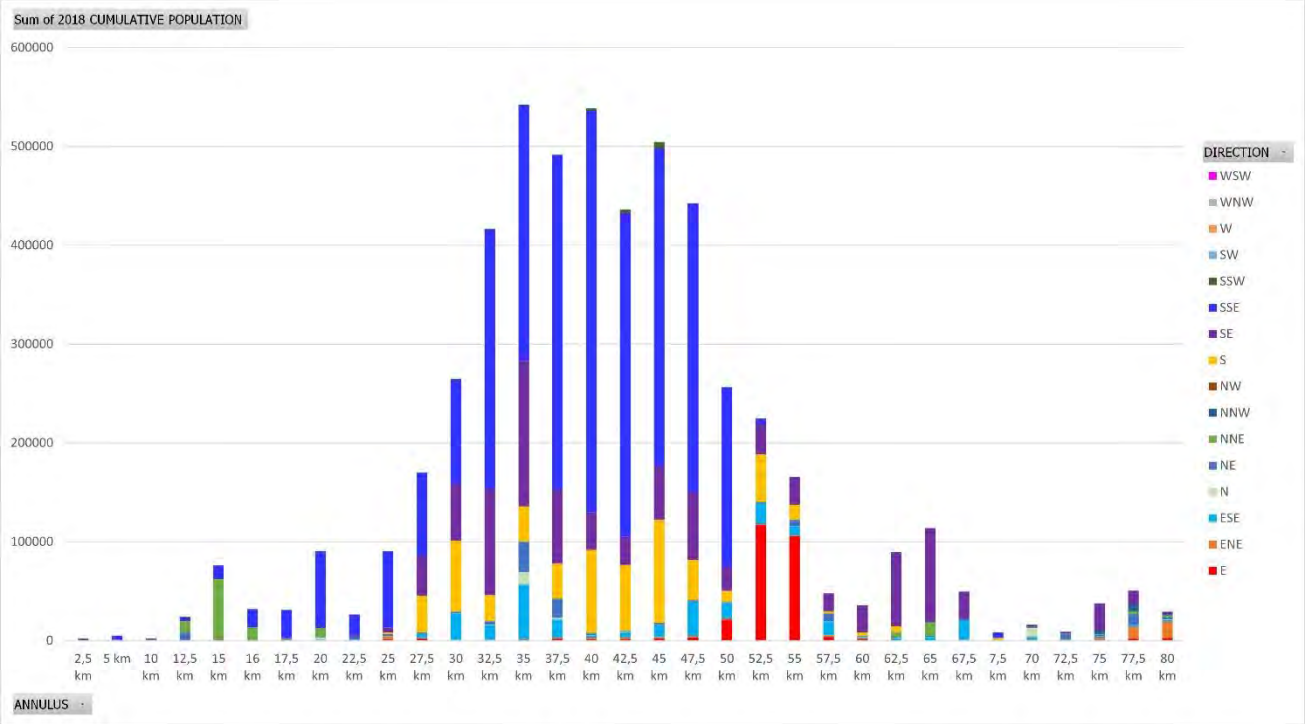


Figure 5.4.25
Total Cumulative Population Within 2.5 km Distance Annuli Around the Duynefontyn Site (5° Radial Grid) up to 80 km (2018)

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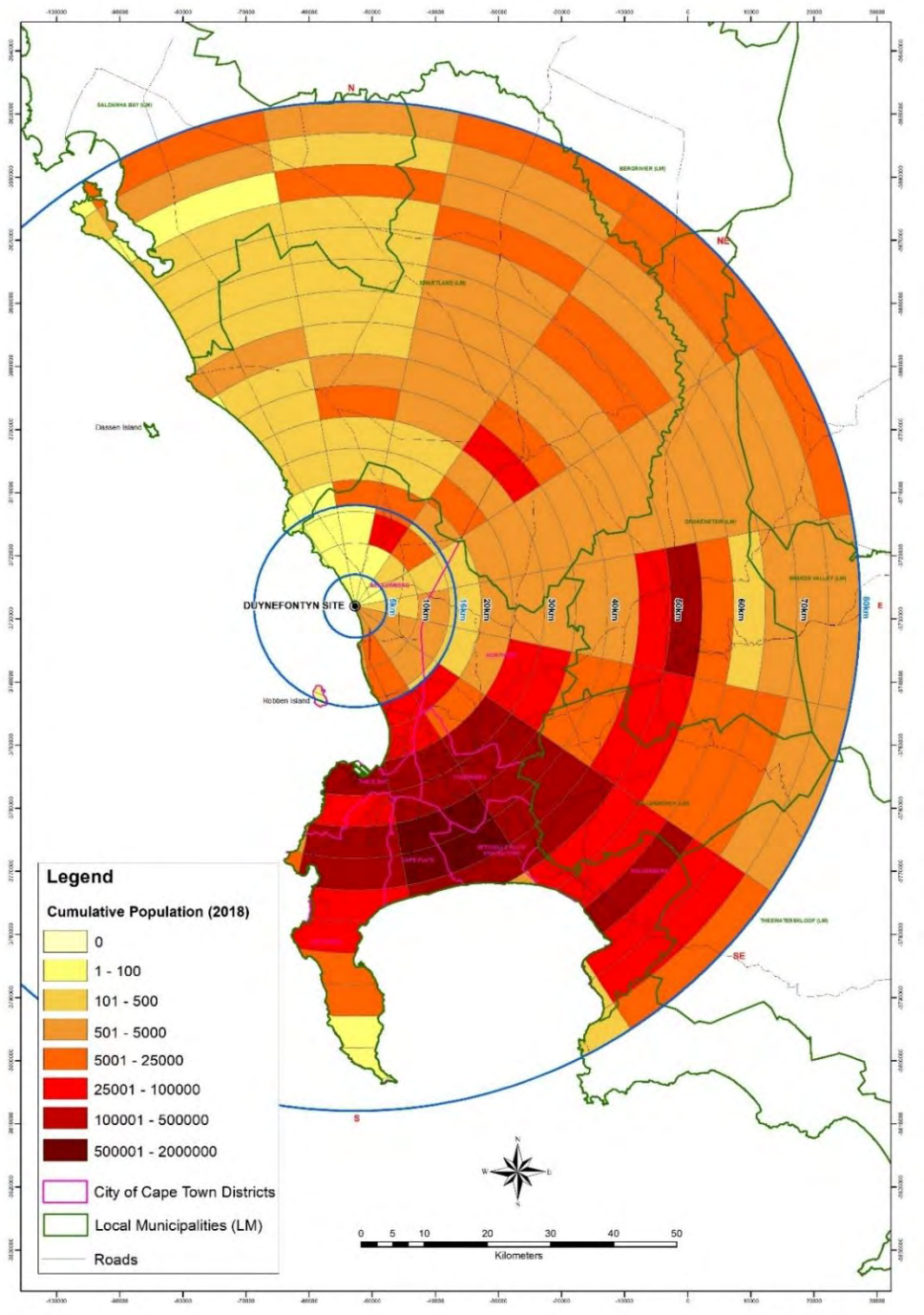


Figure 5.4.26
Total Cumulative Population Within 5 km Distance Annuli Around the Duynefontyn Site (22.5° Radial Grid) up to 80 km (2018)

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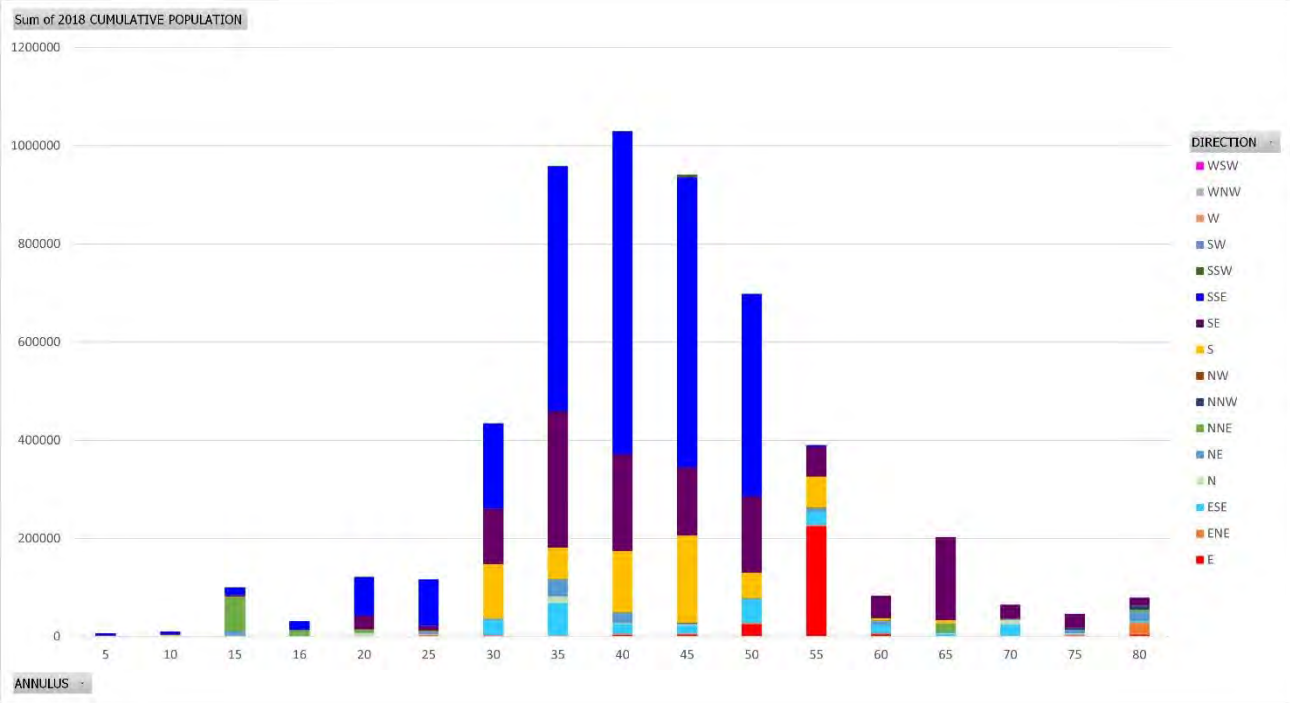


Figure 5.4.27
Total Cumulative Population Within 5 km Distance Annuli Around the Duynefontyn Site (22.5° Radial Grid) up to 80 km (2018)

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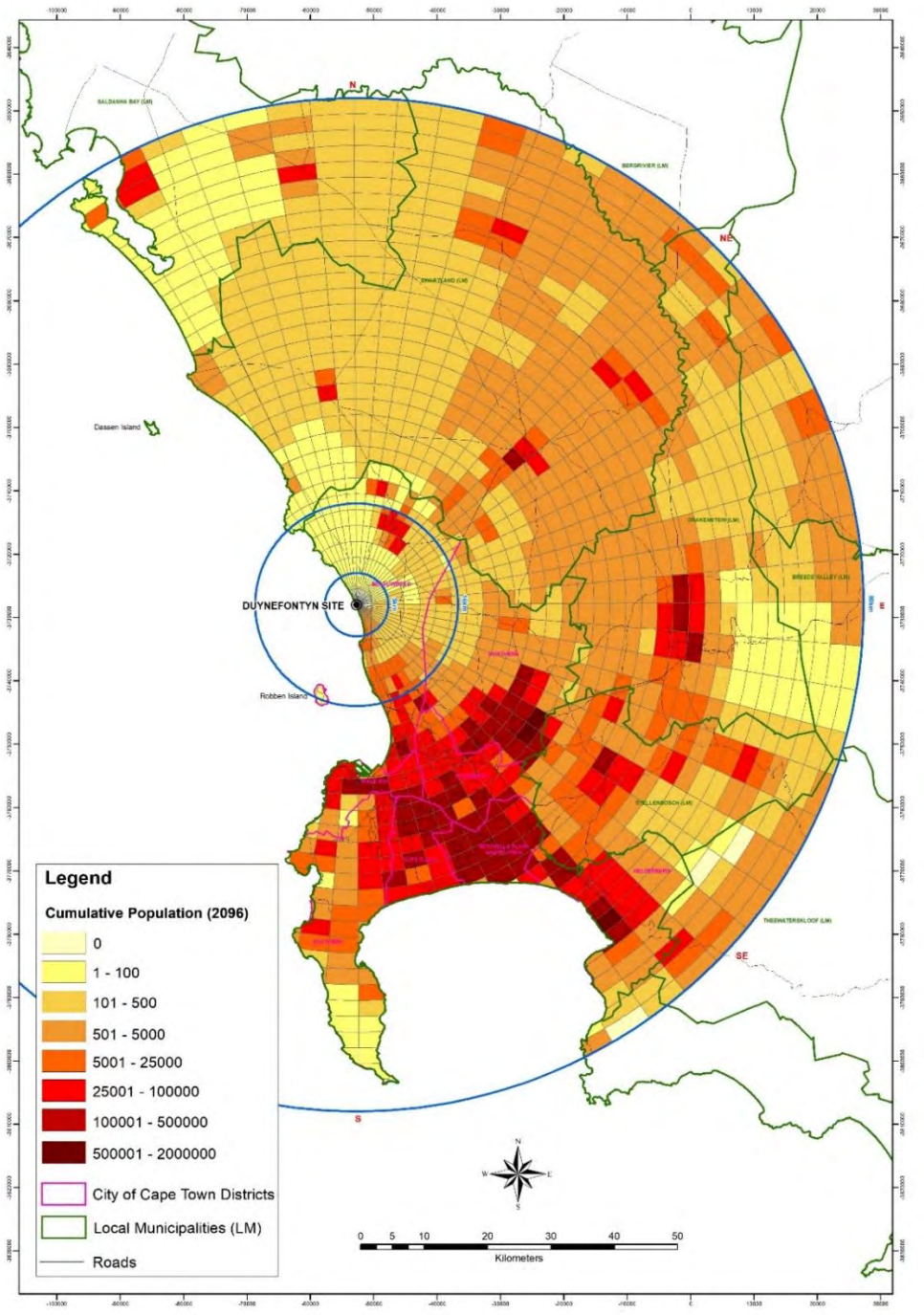


Figure 5.4.28
Total Cumulative Population Within 2.5 km Distance Annuli Around the Duynefontyn Site (5° Radial Grid) up to 80 km (2096)

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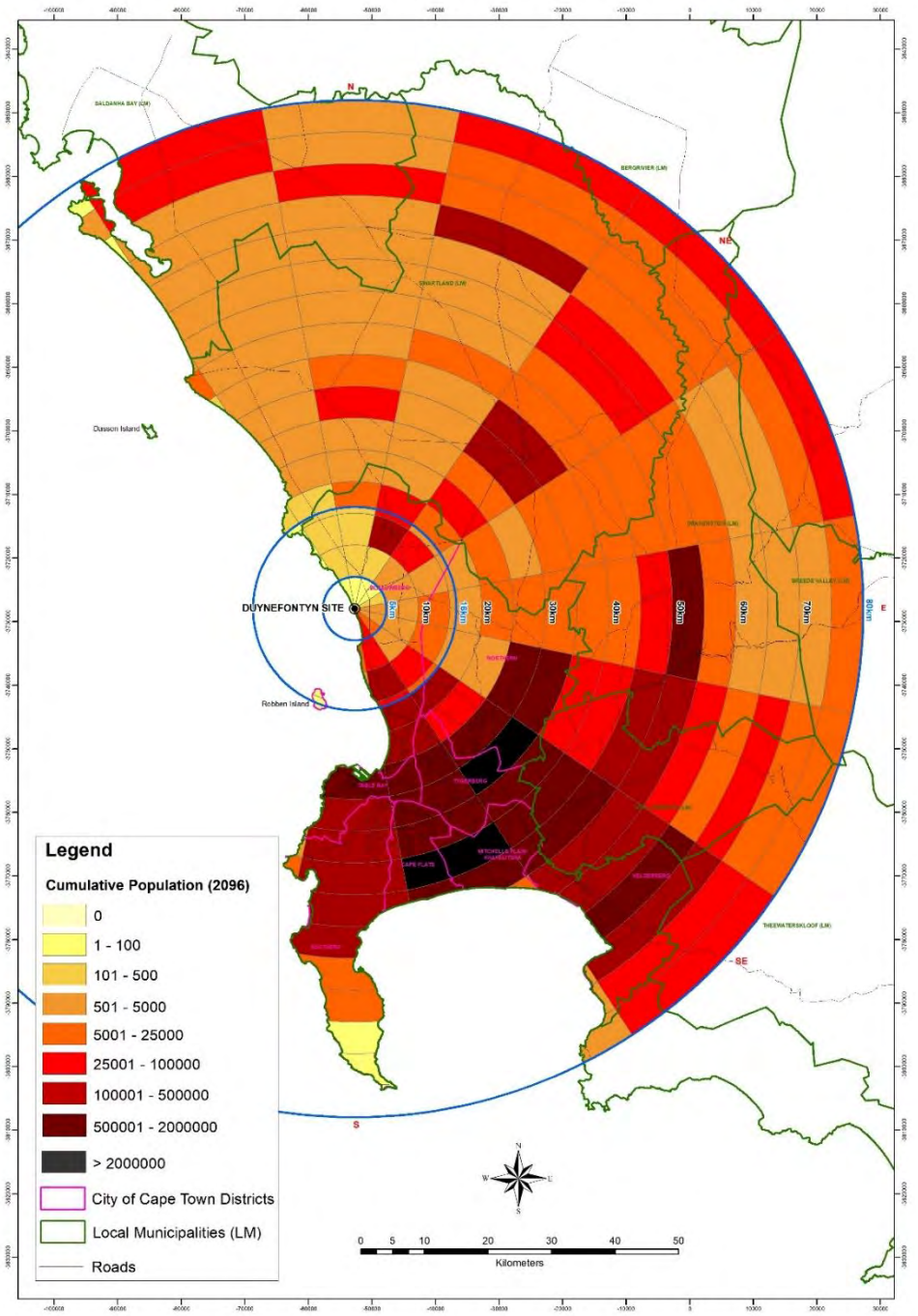


Figure 5.4.29
Total Cumulative Population Within 5 km Distance Annuli Around the Duynefontyn Site (22.5° Radial Grid) up to 80 km (2096)

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5.4.9.2 Cumulative Population Density

Total cumulative population densities have been analysed in order to determine whether they exceed the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) contained in ***Subsection 5.4.3.2*** (Guideline Documents). In this regard, emphasis is placed on the benchmark of a density of approximately 200 persons/km² and not the size of the population centre as a large portion within the 80 km radius consists of ocean, i.e. does not contain residents. Please note that the referenced documents act only as a guide and are not an NNR requirement.

The analysis of the total cumulative population and population density around the site includes the following:

- total cumulative vicinity population and population density per sector (2018);
- total cumulative regional population and population density per sector (2018);
- total cumulative vicinity population and population density per sector (2026);
- total cumulative regional population and population density per sector (2026);
- total cumulative vicinity population and population density per sector (2046);
- total cumulative regional population and population density per sector (2046);
- total cumulative vicinity population and population density per sector (2096);
- total cumulative regional population and population density per sector (2096).

The total cumulative vicinity population density has been analysed

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relative to 2 km, 5 km, 6.5 km, 10 km and 16 km distance annuli and 22.5º radial grids. The results are presented in ***Figures 5.4.30***, ***5.4.32***, ***5.4.34*** and ***5.4.36*** and ***Table 5.4.30*** below.

The total cumulative regional population density is presented relative to 5 km distance annuli and 22.5º radial grids within 80 km from the nuclear installation(s). The results for this analysis are presented in ***Figures 5.4.31***, ***5.4.33***, ***5.4.35*** and ***5.4.37*** and ***Table 5.4.30*** below.

The following indicates the estimated total cumulative population density with respect to various annuli within 80 km from the site centroid as extracted from the results of the analysis:

- **2 km Radius**

  As no persons reside within the 2 km radius, the average cumulative population density is 0 persons/km^2 for 2018, 2026, 2046 and 2096.

- **5 km Radius**

  The average cumulative population density within the 5 km radius (i.e. an area of approximately 49 km^2) is estimated to be approximately 143 persons/km^2 in 2018, approximately 188 persons/km^2 in 2026, approximately 276 persons/km^2 in 2046 and approximately 743 persons/km^2 by 2096.

- **6.5 km Radius**

  The average cumulative population density within the 6.5 km radius (i.e. an area of approximately 79 km^2) is estimated to be approximately 120 persons/km^2 in 2018, approximately 193 persons/km^2 in 2026, approximately 285 persons/km^2 in 2046 and approximately 622 persons/km^2 by 2096.

- **16 km Radius**

  The average cumulative population density within the 16 km radius (i.e. an area of approximately 498 km^2) is estimated to be approximately 300 persons/km^2 in 2018, approximately 386 persons/km^2 in 2026, approximately 598 persons/km^2 in 2046 and approximately 1 628 persons/km^2 by 2096.

- **35 km Radius**

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The average cumulative population density within the 35 km radius (i.e. area of approximately 2 287 km^2) is estimated to be approximately 779 persons/km^2 in 2018, approximately 943 persons/km^2 in 2026, approximately 1 418 persons/km^2 in 2046 and approximately 4 250 persons/km^2 by 2096.

- **50 km Radius**

  The average cumulative population density within the 50 km radius (i.e. approximately 4 740 km^2) is estimated to be approximately 939 persons/km^2 in 2018, approximately 1 117 persons/km^2 in 2026, approximately 1 573 persons/km^2 in 2046 and approximately 3 900 persons/km^2 by 2096.

- **80 km Radius**

  The average cumulative population density within the 80 km radius (i.e. approximately 11 004 km^2) is estimated to be approximately 483 persons/km^2 in 2018, approximately 578 persons/km^2 in 2026, approximately 818 persons/km^2 in 2046 and approximately 2 036 persons/km^2 by 2096.

The total cumulative population estimates indicate that the site conforms to the abovementioned international guidance for the 6.5 km radius in 2018 and 2026.

Based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection), the site may possibly not conform to these guidelines for the 6.5 km radius in 2046 and 2096 and the 16 km, 35 km and 50 km radii for 2018, 2026, 2046 and 2096. Please note that the referenced documents act only as a guide and are not an NNR requirement.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated in the City of Cape Town Municipal Spatial Development Framework (2023) (City of Cape Town, 2023a), the Blaauwberg District Spatial Development Framework (2023) (City of Cape Town, 2023b) and the City of Cape Town Municipal Planning By-Law, 2015 (City of Cape Town, 2015) t with its Development Management Scheme (as amended 2019) o control development around the nuclear installation(s).

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Table 5.4.30
Estimated Total Cumulative Population Density (2018, 2026, 2046 and 2096)

	Radius						
	2 km	**5 km**	**6.5 km**	**16 km**	**35 km**	**50 km**	**80 km**
Land Area (km²)	7	49	79	498	2 287	4 740	11 004
2018							
No. of People	0	7 010	9 470	149 480	1 781 440	4 451 480	5 319 790
Density (people/km²)	**0**	**143**	**120**	**300**	**779**	**939**	**483**
2026							
No. of People	0	9 200	15 240	192 320	2 155 770	5 293 420	6 362 660
Density (people/km²)	**0**	**188**	**193**	**386**	**943**	**1 117**	**578**
2046							
No. of People	0	13 520	22 480	297 850	3 241 910	7 455 770	9 004 530
Density (people/km²)	**0**	**276**	**285**	**598**	**1 418**	**1 573**	**818**
2096							
No. of People	0	36 380	49 160	810 820	9 720 300	18 483 950	22 400 120
Density (people/km²)	**0**	**743**	**622**	**1 628**	**4 250**	**3 900**	**2 036**

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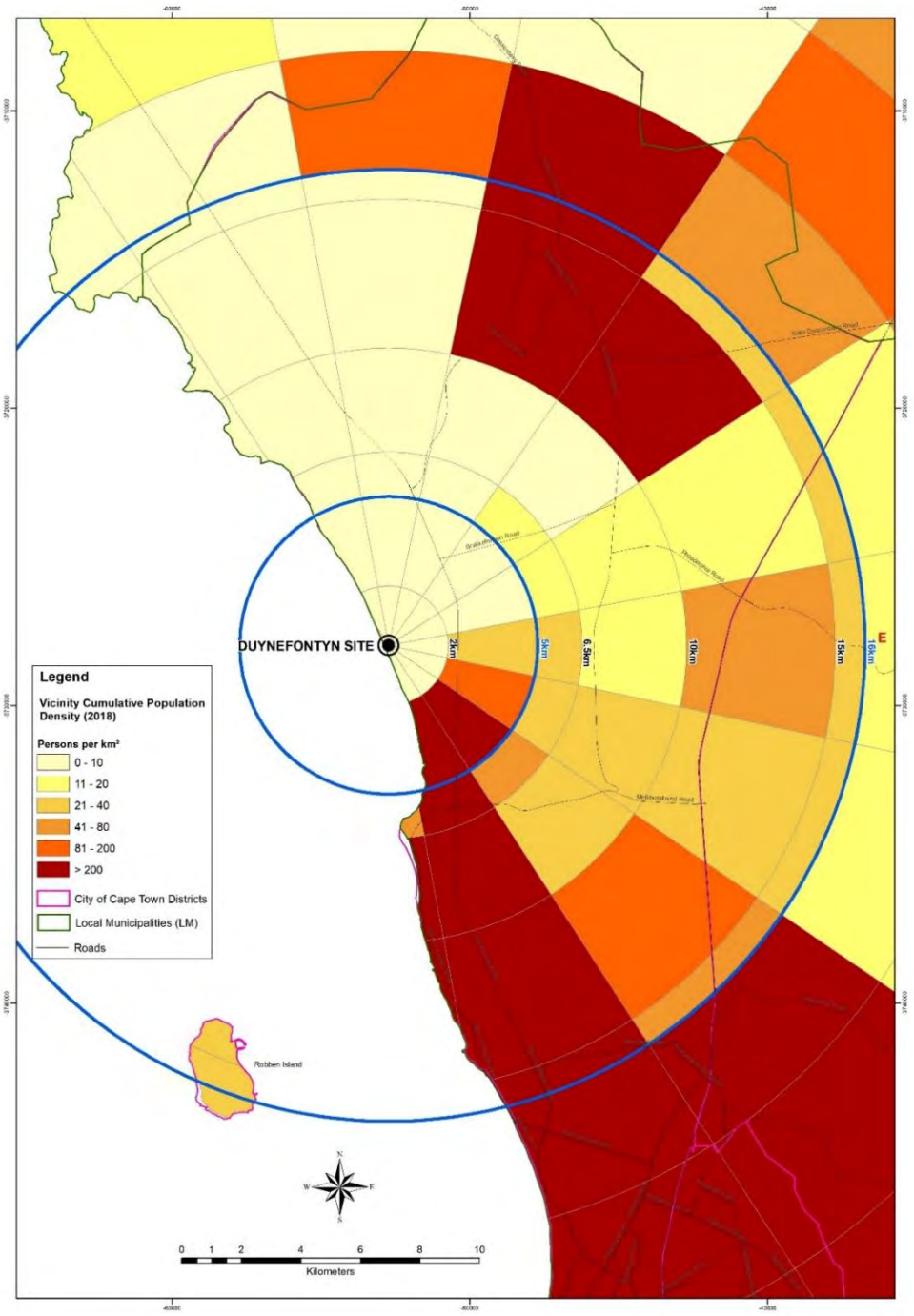


Figure 5.4.30
Total Cumulative Vicinity Population Density (2018)

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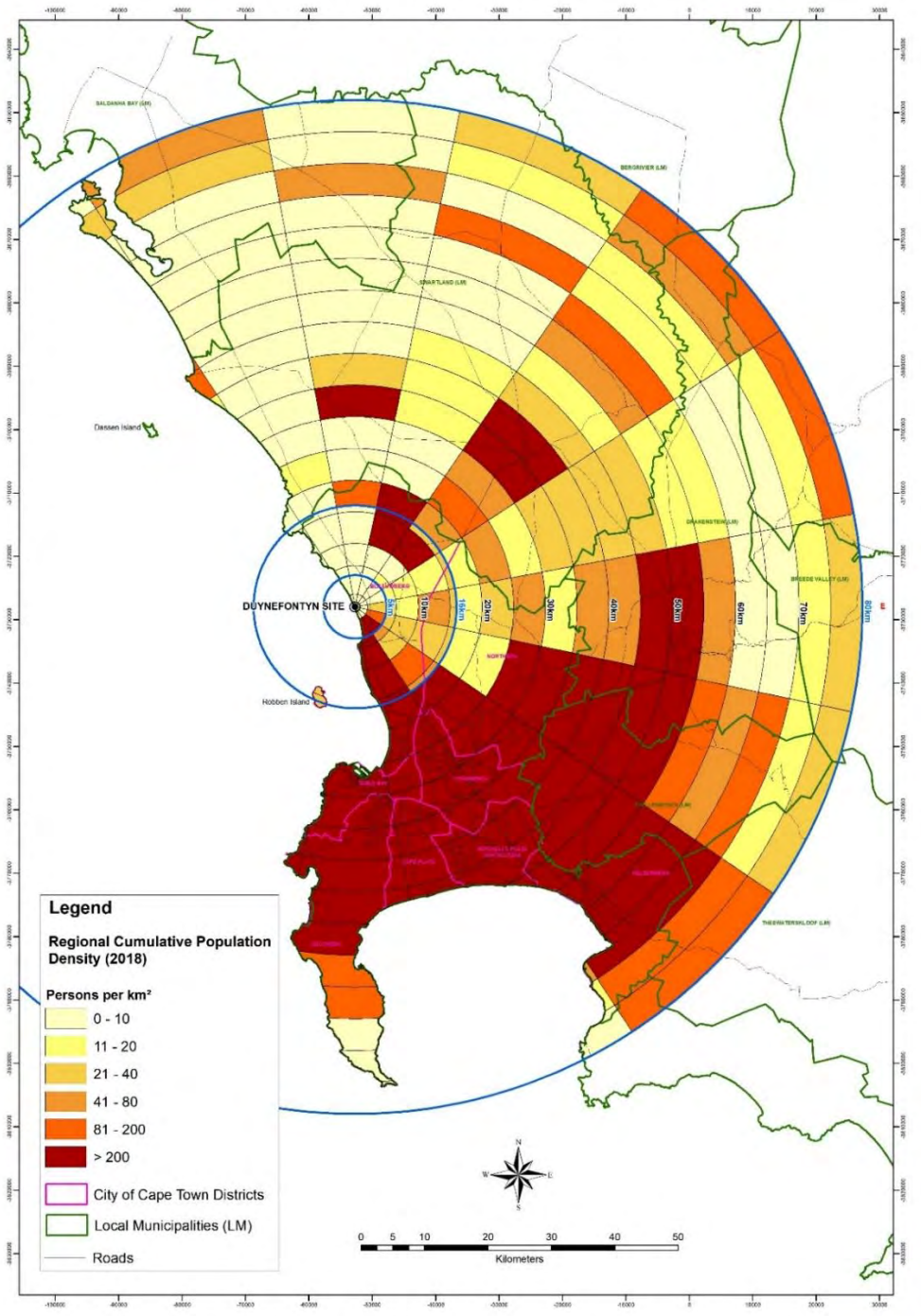


Figure 5.4.31
Total Cumulative Regional Population Density (2018)

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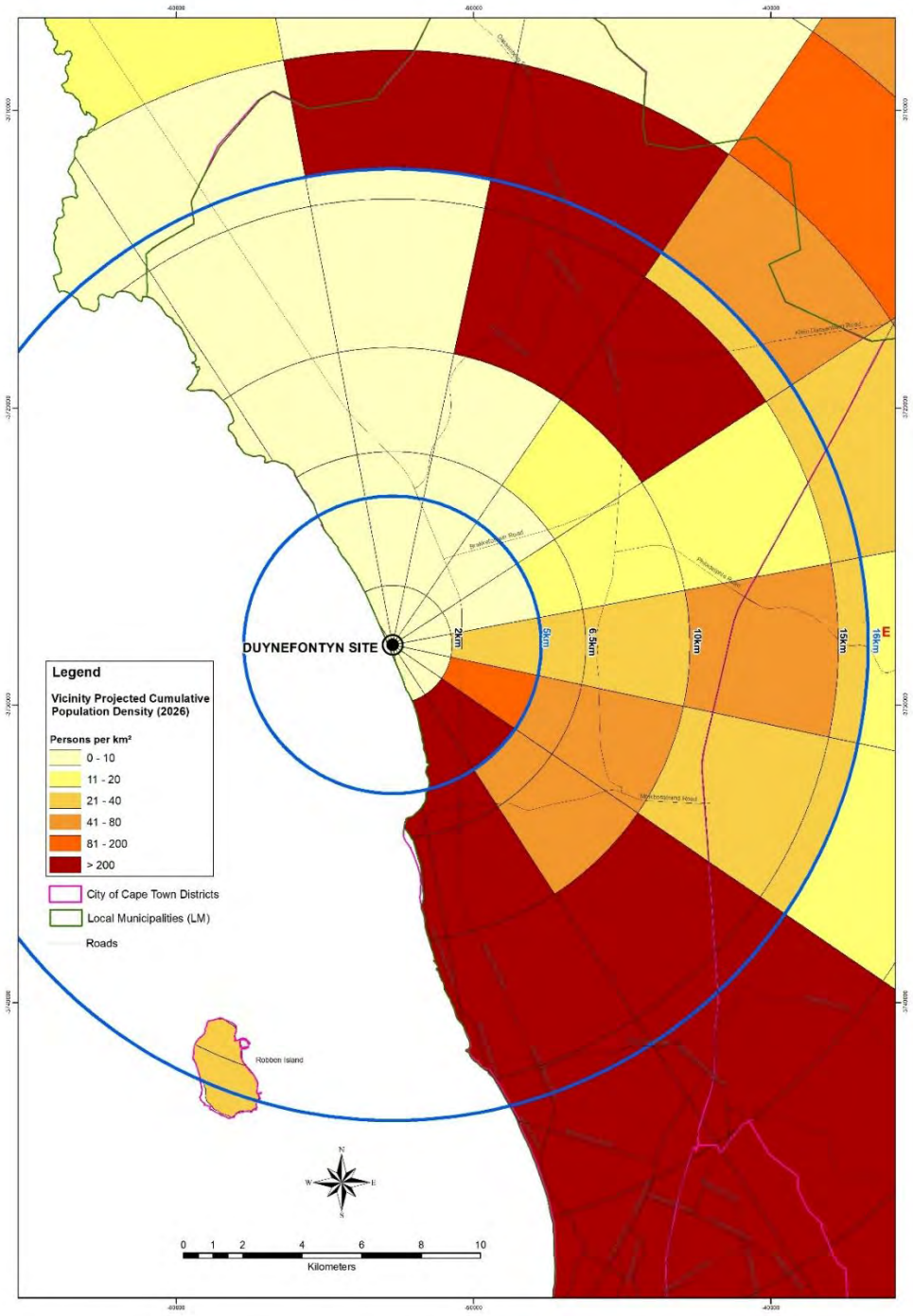


Figure 5.4.32
Total Cumulative Vicinity Population Density (2026)

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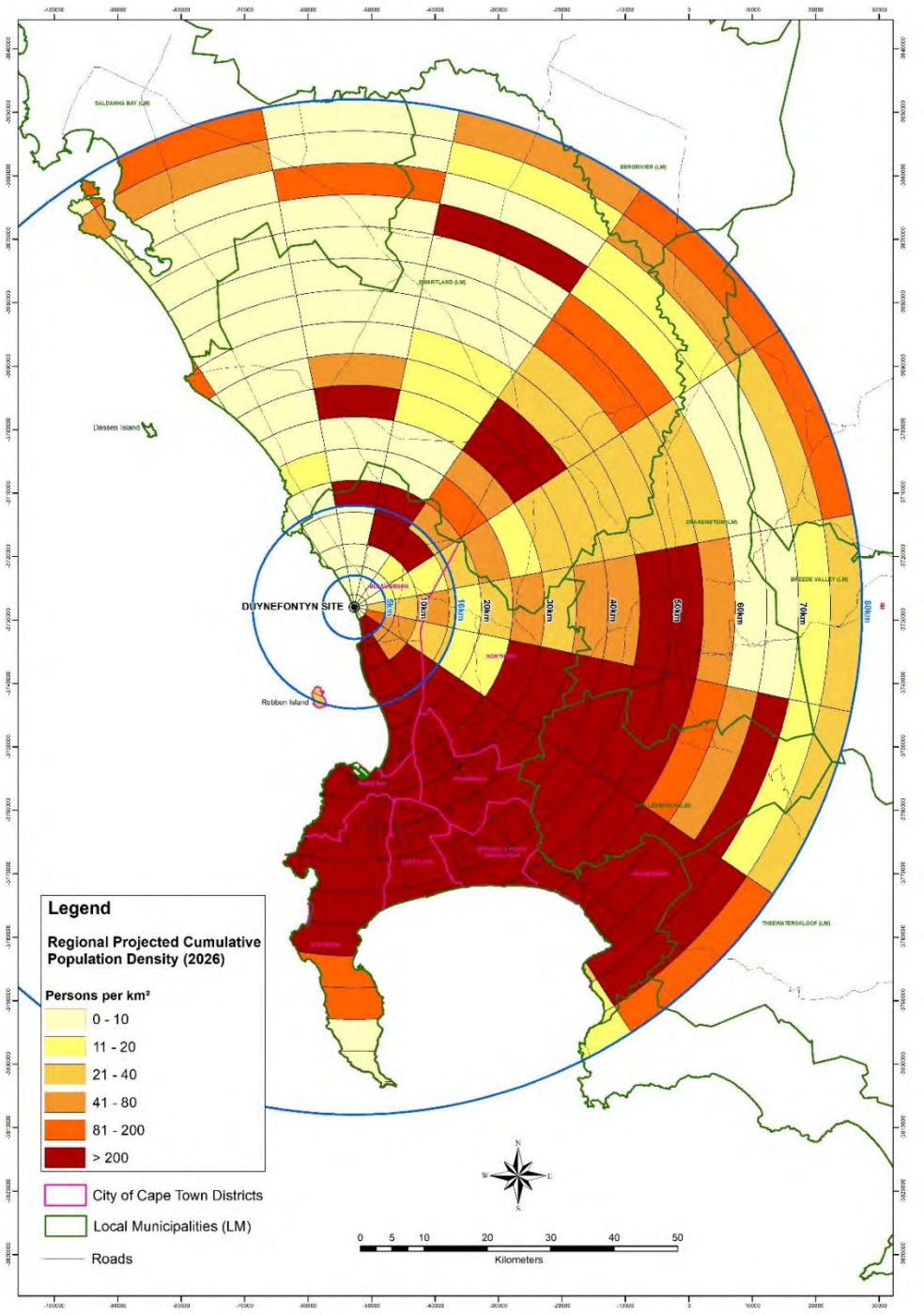


Figure 5.4.33
Total Cumulative Regional Population Density (2026)

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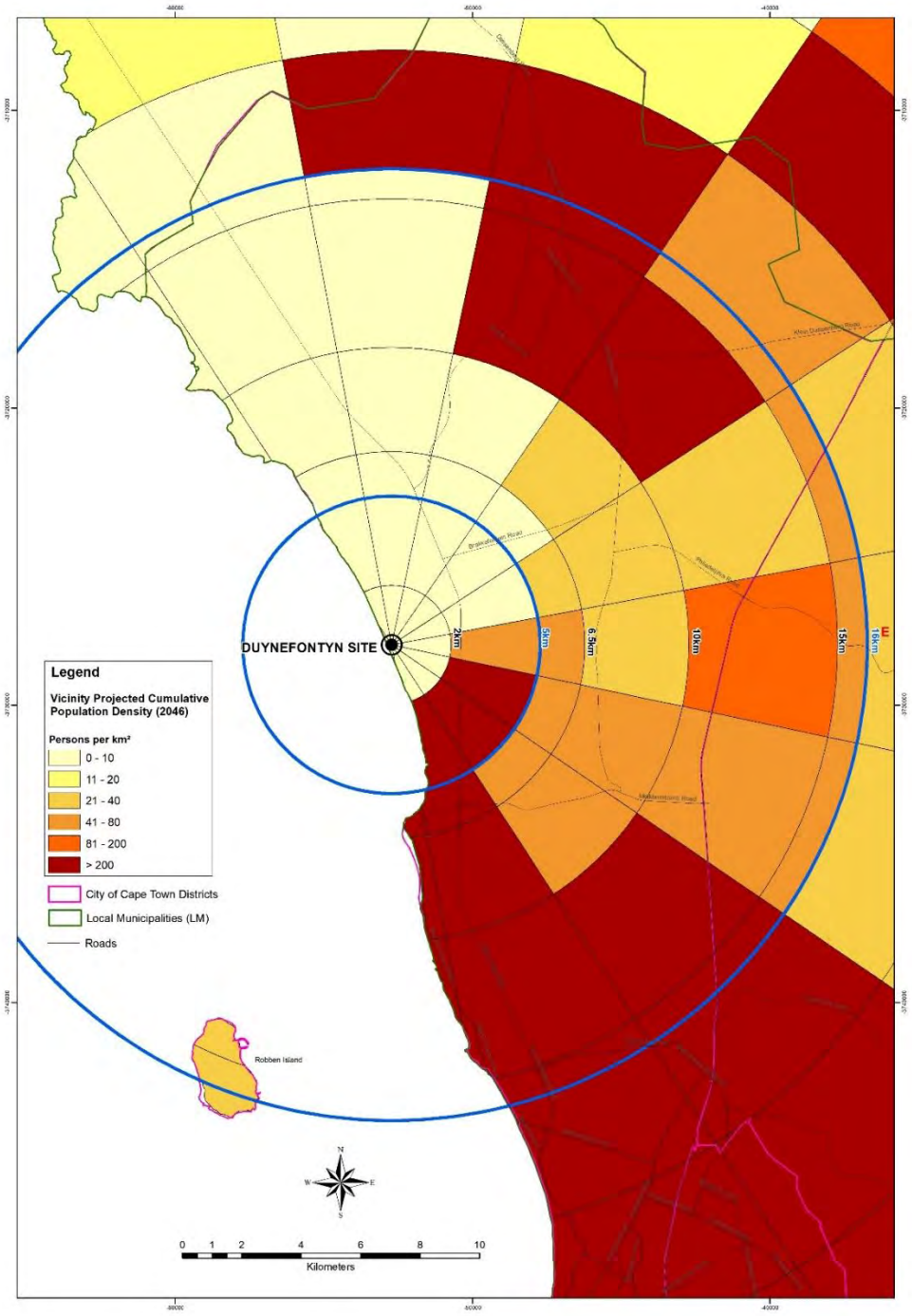


Figure 5.4.34
Total Cumulative Vicinity Population Density (2046)

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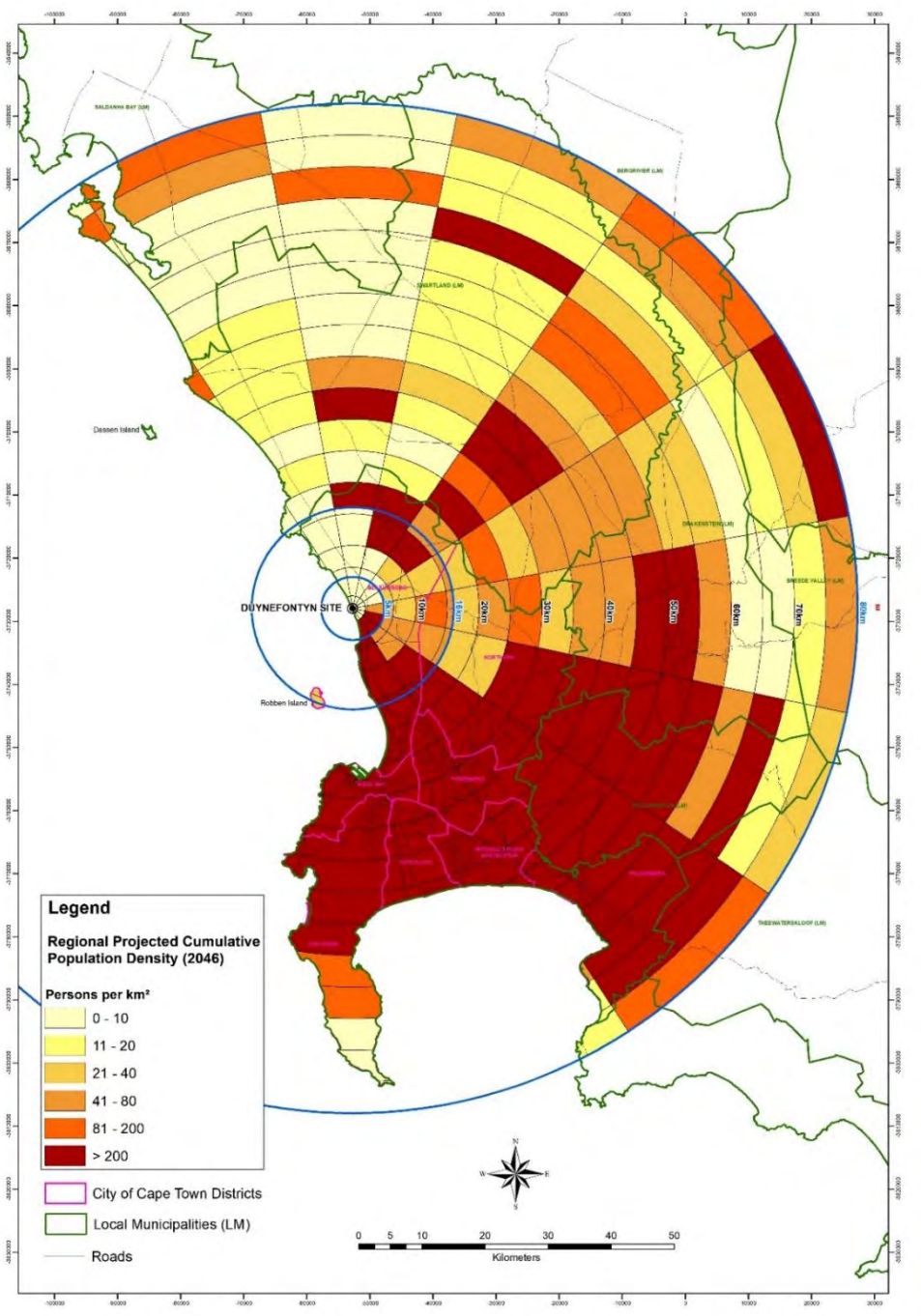


Figure 5.4.35
Total Cumulative Regional Population Density (2046)

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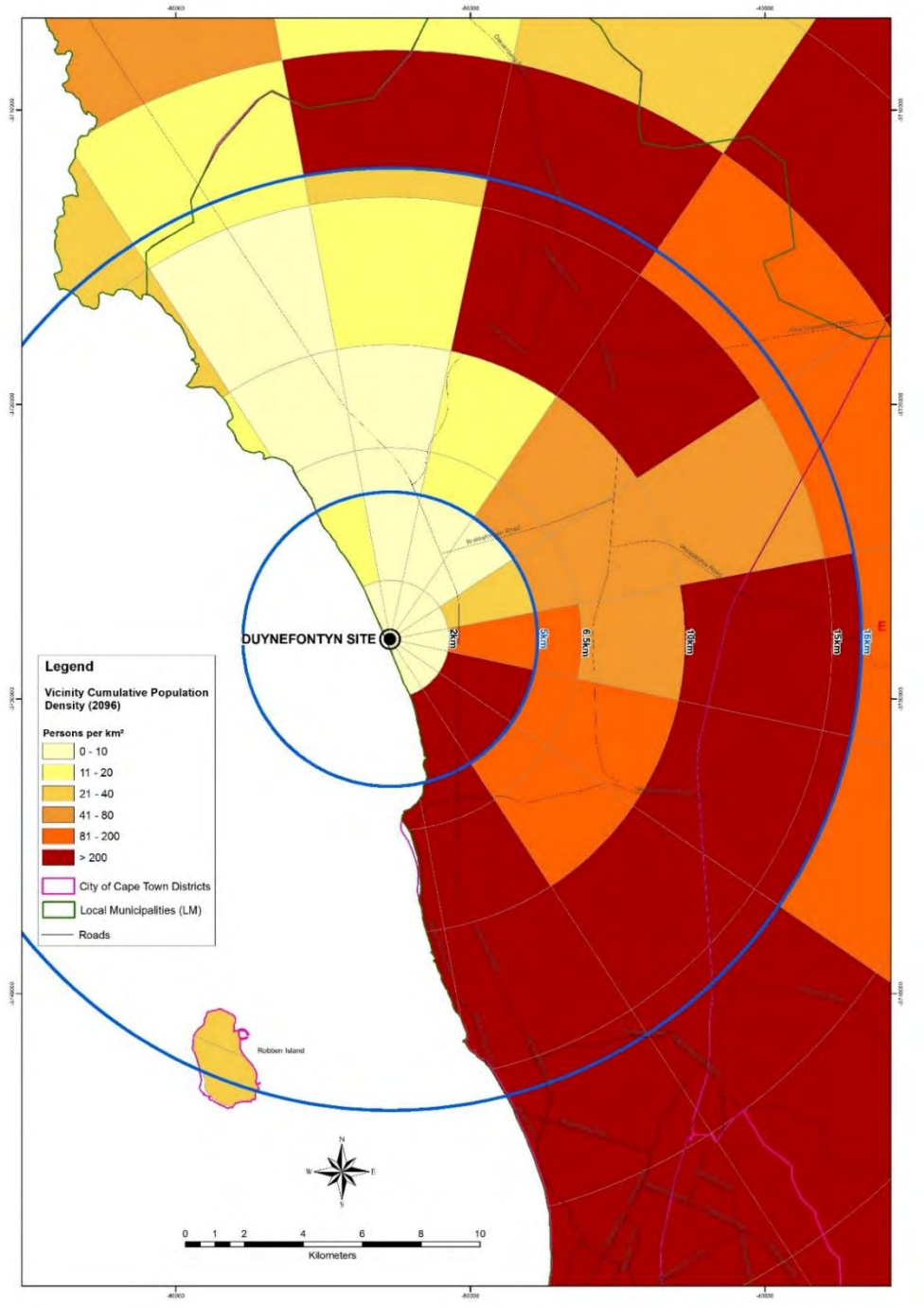


Figure 5.4.36
Total Cumulative Vicinity Population Density (2096)

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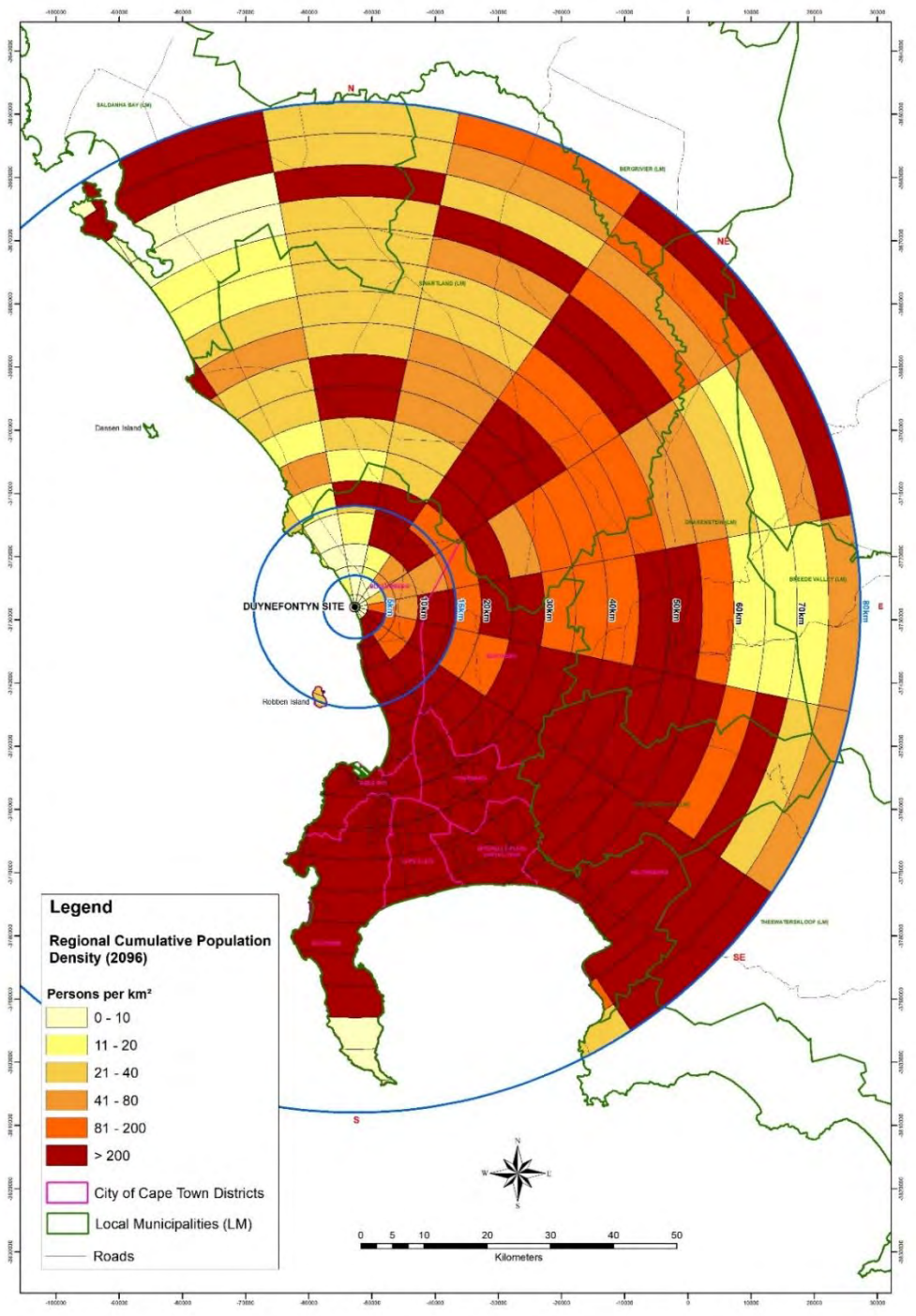


Figure 5.4.37
Total Cumulative Regional Population Density (2096)

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5.4.9.3 Cumulative Population Centres

Total cumulative population centres have been analysed in order to determine whether they exceed the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) contained in ***Subsection 5.4.3.2*** (Guideline Documents). In this regard, emphasis is placed on the benchmark of a density of approximately 200 persons/km² and not the size of the population centre as a large portion within the 80 km radius consists of ocean, i.e. does not contain residents. Please note that the referenced documents act only as a guide and are not an NNR requirement.

The following indicates the estimated total cumulative population numbers in 2018, 2026, 2046 and 2096 with respect to various annuli within 80 km from the site centroid as extracted from the results of the analysis:

- **6.5 km Radius**

  The neighbourhoods of Duynefontein, Van Riebeeckstrand and a portion of Melkbosstrand form the largest settlement located within 6.5 km of the site and is estimated to have a combined total cumulative population of approximately 8 150 persons in 2018, approximately 14 660 persons in 2026, approximately 21 710 persons in 2046 and approximately 46 400 persons by 2096.

  The total cumulative population within the 6.5 km radius is estimated to be approximately 9 470 persons in 2018, approximately 15 240 persons in 2026, approximately 22 480 persons in 2046 and approximately 49 160 persons by 2096.

- **16 km Radius**

  The town of Atlantis (7.5 km to 16 km north-northeast) is the largest populated area within the 16 km radius and is estimated to have a cumulative population of approximately 91 160 persons in 2018, approximately 102 390 persons in 2026, approximately 150 720 persons in 2046 and approximately 405 660 persons by 2096.

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The total cumulative population within the 16 km radius is estimated to be approximately 149 480 persons in 2018, approximately 192 320 persons in 2026, approximately 297 850 persons in 2046 and approximately 810 820 persons by 2096.

- **35 km Radius**

  Urban portions of the City of Cape Town located 10 to 35 km towards the south, south-southeast, southeast and east-southeast form the largest populated area within the 35 km radius and is estimated to have a cumulative population of approximately 1 047 030 persons in 2018, approximately 1 913 670 persons in 2026, approximately 2 873 100 persons in 2046 and approximately 6 020 010 persons by 2096.

  The total cumulative population within the 35 km radius is estimated to be approximately 1 781 440 persons in 2018, approximately 2 155 770 persons in 2026, approximately 3 241 910 persons in 2046 and approximately 9 720 300 persons by 2096.

- **50 km Radius**

  Urban portions of the City of Cape Town located 10 to 50 km towards the south, south-southeast, southeast and east-southeast form the largest populated area within the 50 km radius and is estimated to have a cumulative population of approximately 3 996 980 persons in 2018, approximately 4 781 630 persons in 2026, approximately 6 696 930 persons in 2046 and approximately 16 441 600 persons by 2096.

  The total cumulative population within the 50 km radius is estimated to be approximately 4 451 480 persons in 2018, approximately 5 293 420 persons in 2026, approximately 7 455 770 persons in 2046 and approximately 18 483 950 persons by 2096.

- **80 km Radius**

  Urban portions of the City of Cape Town located 10 to 75 km towards the south, south-southeast, southeast and east-southeast form the largest populated area within the 80 km radius and is estimated to have a cumulative population of approximately 4 362 070 persons in 2018, approximately 5 235 550 persons in 2026, approximately 7 389 180 persons in 2046 and approximately 18 442 880 persons

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by 2096.

The total cumulative population within the 80 km radius is estimated to be approximately 5 319 790 persons in 2018, approximately 6 362 660 persons in 2026, approximately 9 004 530 persons in 2046 and approximately 22 400 120 persons by 2096.

The total cumulative population estimates indicate that the site conforms to the abovementioned international guidance for the 6.5 km radius in 2018 and 2026.

Based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection), the site may possibly not conform to these guidelines for the 6.5 km radius in 2046 and 2096 and the 16 km, 35 km and 50 km radii for 2018, 2026, 2046 and 2096. Please note that the referenced documents act only as a guide and are not an NNR requirement.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the City of Cape Town Municipal Spatial Development Framework (2023) (City of Cape Town, 2023a), the Blaauwberg District Spatial Development Framework (2023) (City of Cape Town, 2023b) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) (City of Cape Town, 2015) to control development around the nuclear installation(s).

5.4.10 Main Regional Activities

5.4.10.1 Current Regional Activities

The current regional activities are presented in ***Sections 5.5*** (Land and Water Use), ***5.6*** (Adjacent Sea Use) and ***5.7*** (Nearby Transportation, Industrial and Military Facilities).

5.4.10.2 Projected Regional Activities and Measures to Control Development around the Site

Several statutes influence the use of land in the Western Cape Province.

The Local Government: Municipal Systems Act, 2000 (Republic of South Africa, 2000) provides for *inter alia* forward planning documentation such

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as structure plans and spatial development frameworks (SDFs) to be adopted in terms of municipal integrated development plans.

The Western Cape Land Use Planning Act, 2014 (Western Cape Government, 2014) has replaced the previous Land Use Planning Ordinance, 1985. The purpose of the Act is to:

- provide for minimum standards for, and the efficient coordination of, spatial development frameworks;
- consolidate legislation in the Province pertaining to provincial planning, support and monitoring of municipal planning and regulation of public places and regional planning and development, urban and rural development, regulation, support and monitoring of municipal planning and regulation of public places and municipal roads arising from subdivisions;
- make provision for provincial spatial development frameworks;
- provide for minimum norms and standards for effective municipal development management;
- regulate provincial development management;
- regulate the effect of land development on agriculture;
- provide for land use planning principles;
- repeal certain old-order laws;
- provide for matters incidental thereto.

The land use planning principles contained in the Western Cape Land Use Planning Act apply to all organs of state responsible for the implementation of legislation regulating the utilisation and development of land and guide:

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- the preparation, adoption and implementation of an SDF or zoning scheme and of any policy or law concerning land use planning;
- any steps to ensure sustainable development;
- the consideration by a competent authority in terms of the Act and any other relevant authority of an application that impacts on the utilisation and development of land;
- the performance of a function in terms of the Act or other legislation regulating land use planning.

The Western Cape Land Use Planning Act contains the following five key development principles:

- spatial justice;
- spatial sustainability;
- efficiency;
- good administration;
- spatial resilience.

Within the Western Cape Province, local authorities have, based on the prescriptions and guidance provided in the Local Government: Municipal Systems Act and Western Cape Land Use Planning Act, drafted and adopted municipal planning by-laws for their respective areas of jurisdiction. In this regard, the City of Cape Town has adopted the City of Cape Town Municipal Planning By-Law, 2015 (City of Cape Town, 2015). The purpose of the by-law is to regulate and control municipal planning matters within the geographical area of the City. This includes *inter alia*:

- spatial planning (i.e. SDFs);
- development management (i.e. zoning schemes / development management schemes);
- application requirements;
- application procedures;

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- decision making;
- enforcement.

An SDF forms a component of a local authority's integrated development plan and reflects the vision for the development of the municipal area. It guides and directs future development in the municipality's area of jurisdiction. As such, authorities would evaluate all development proposals against the proposals and policies contained in SDFs. Authorities must regularly review forward planning documents and frameworks (approximately every ten years).

The projected regional activities (which influence population distribution) around the nuclear installation(s) are to a large extent determined by the control of land use and spatial planning. Future activities are therefore presented by discussing the strategic spatial planning strategies and policies adopted by the City of Cape Town, i.e. the City of Cape Town Municipal Spatial Development Framework (2023) (City of Cape Town, 2023a) and the Blaauwberg District Spatial Development Framework (2023) (City of Cape Town, 2023b).

The City of Cape Town Municipal Spatial Development Framework (2023) and the Blaauwberg District Spatial Development Framework (2023) are the most recent spatial planning frameworks relevant to the area surrounding the site for the development of a nuclear installation(s) and are described in more detail below.

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City of Cape Town Municipal Spatial Development Framework (2023)

The City of Cape Town Municipal Spatial Development Framework, 2023 (MSDF) (City of Cape Town, 2023a) is an approved development framework in terms of the Local Government: Municipal Systems Act, 2000 (Republic of South Africa, 2000) and is deemed to be the municipal spatial development framework applicable in terms of the City of Cape Town Municipal Planning By-Law, 2015 (City of Cape Town, 2015).

To provide access to more opportunities for more people, the City of Cape Town's focus is on inward growth and investment to support dense, diverse and transit-oriented land uses as it is regarded as more resilient and sustainable. The MSDF does however also provide for the development of currently undeveloped land on the fringes of the city.

The MSDF's spatial vision is a city committed to:

- working in partnership with the private and public sector;
- addressing spatial injustice and inequality and avoiding the creation of new structural imbalances in the delivery of services or the availability of economic and residential opportunities;
- meeting sustainability obligations while responding to social, economic, climate and resource shocks and stresses.

The MSDF states that to realise the spatial vision and work towards a restructured urban form and function for Cape Town the following imperatives and partnerships are essential:

- An efficient, safe and affordable public transport system in line with the concept of transit oriented development (TOD) and land use intensification (i.e. diversification and densification) in and around transit corridors, nodal points; serviced by an existing and future public transport network.
- Co-ordination, prioritisation and implementation of development and investment aligned to the MSDF's Spatial Transformation Areas investment rationale.
- Acknowledgment of inherent natural and man-made risks and land development directives.

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- Co-ordination focused on enhancing and optimising the world renowned natural, cultural and heritage value of Cape Town in a sustainable way.

- Reinforcement of critical infrastructure elements that support Cape Town's metropolitan functionality.

- An effective approach to social infrastructure provision (clustering of community facilities, optimisation and rationalisation of City assets) as a critical contributor to the realisation of the MSDF spatial vision.

- Preservation and enhancement of the natural assets of the city and the conservation of cultural heritage assets.

The MSDF identifies areas suitable for urban development and catalytic interventions to achieve spatial transformation; areas where the impact of development must be managed; and areas not suited for urban development. The MSDF states that the basis for growth management in the city is established via four primary spatial transformation areas (refer to ***Drawing 5.4.23*** below). These spatial transformation areas are:

- Urban Inner Core;

- Incremental Growth and Consolidation Areas;

- Discouraged Growth Areas, which include Areas of Agricultural Significance;

- Critical Natural Assets.

The MSDF makes use of the 'urban development edge' as a complementary growth management tool to manage land development in the Cape Metropolitan Area (CMA). The urban development edge delineation is intended to:

- protect areas of agricultural significance;

- limit uncontrolled urban sprawl to areas aligning within long term engineering infrastructure networks;

- allow for the optimisation of vacant and under-utilised land within the built-up area;

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- allow for horizontal expansion opportunities of urban development in areas away from risk region areas;
- promote risk averse, sustainable and resilient development;
- protect the functional integrity of sensitive biodiversity;
- ensure efficiency increases in service delivery of centrally located government sponsored social and community facilities and public transport.

The MSDF supports the prioritisation of public investment and incentivised private sector investment in support of growth areas in the *Urban Inner Core*. The desired land use outcome of the Urban Inner Core is diverse and dense land uses, in association with current and future public transport infrastructure provision. The Urban Inner Core includes the majority of the City of Cape Town's existing industrial and commercial nodes; the airport, ports and primary freight infrastructure; the integration zones, integrated public transport network corridors and transport / transit accessible precincts. The City of Cape Town intends to prioritise these areas for investment and co-investment (i.e. public and private). These areas are all located to the south and southeast of the nuclear installation(s).

Incremental Growth and Consolidation Areas are areas where the City of Cape Town is committed to servicing existing communities and where new development will be subject to infrastructure capacity. The desired land use outcome of Incremental Growth and Consolidation Areas is diverse and dense development, where infrastructure allows. These areas are located adjacent to the Urban Inner Core, but also include other areas of existing urban development and land adjacent thereto where incremental growth could be considered (e.g. Melkbosstrand).

The MSDF states that the City of Cape Town will not invest in urban development in *Discouraged Growth Areas*, which include protected areas based on natural and agricultural assets, areas with a lack of social and physical infrastructure and areas that do not contribute to spatial transformation, inward growth or the premise of transit oriented development. The desired land use outcome of Discouraged Growth Areas is to limit land use to agriculture and rural zone uses. A vast area towards the north, northeast, east and southeast of the nuclear installation(s) is demarcated as Discouraged Growth Areas.

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Critical Natural Asset areas are areas that contribute significantly to the City of Cape Town's future resilience and/or have protection status in law. The desired land use outcome of Critical Natural Asset areas is to enhance and connect the critical natural assets that support the city and regional environment and ecology. They include a number of protected natural environments and conservation areas outside the Urban Inner Core and Incremental Growth and Consolidation Areas. Areas directly to the north, east and south of the nuclear installation(s) are demarcated as Critical Natural Asset areas.

Map 5a: Precautionary Risk Areas (refer to ***Drawing 5.4.24*** below) as contained in the MSDF, identifies various precautionary areas located within the City of Cape Town. Development directives in Precautionary Areas that directly relate to the nuclear installation(s) include the following:

"*No new development is permissible within the Precautionary Action Zone (area within a 5 km radius of the Koeberg nuclear reactors) other than development that is directly related to the siting, construction, operation and decommissioning of the KNPS or that is a result of the exercising of existing zoning rights.*"

The MSDF contains three main spatial strategies, being:

- Spatial strategy 1: Plan for economic growth and improve access to economic opportunities.
- Spatial strategy 2: Manage urban growth and create a balance between urban development, food security and environmental protection.
- Spatial strategy 3: Build and inclusive, integrated and vibrant city.

Each main strategy has various spatial sub-strategies, policies and sub-policies. Spatial strategy 2 contains the following sub-strategy, policy and policy guidelines that directly relate to the nuclear installation(s):

"***Sub-strategy 2.3***: *Appropriately protect the citizens of Cape Town from risk areas and activities*

Policy 16: *Direct urban growth away from risk areas and activities*

P16.7 *Land development proposals within the Precautionary Action Zone (PAZ) and Urgent Protection Action Zone*

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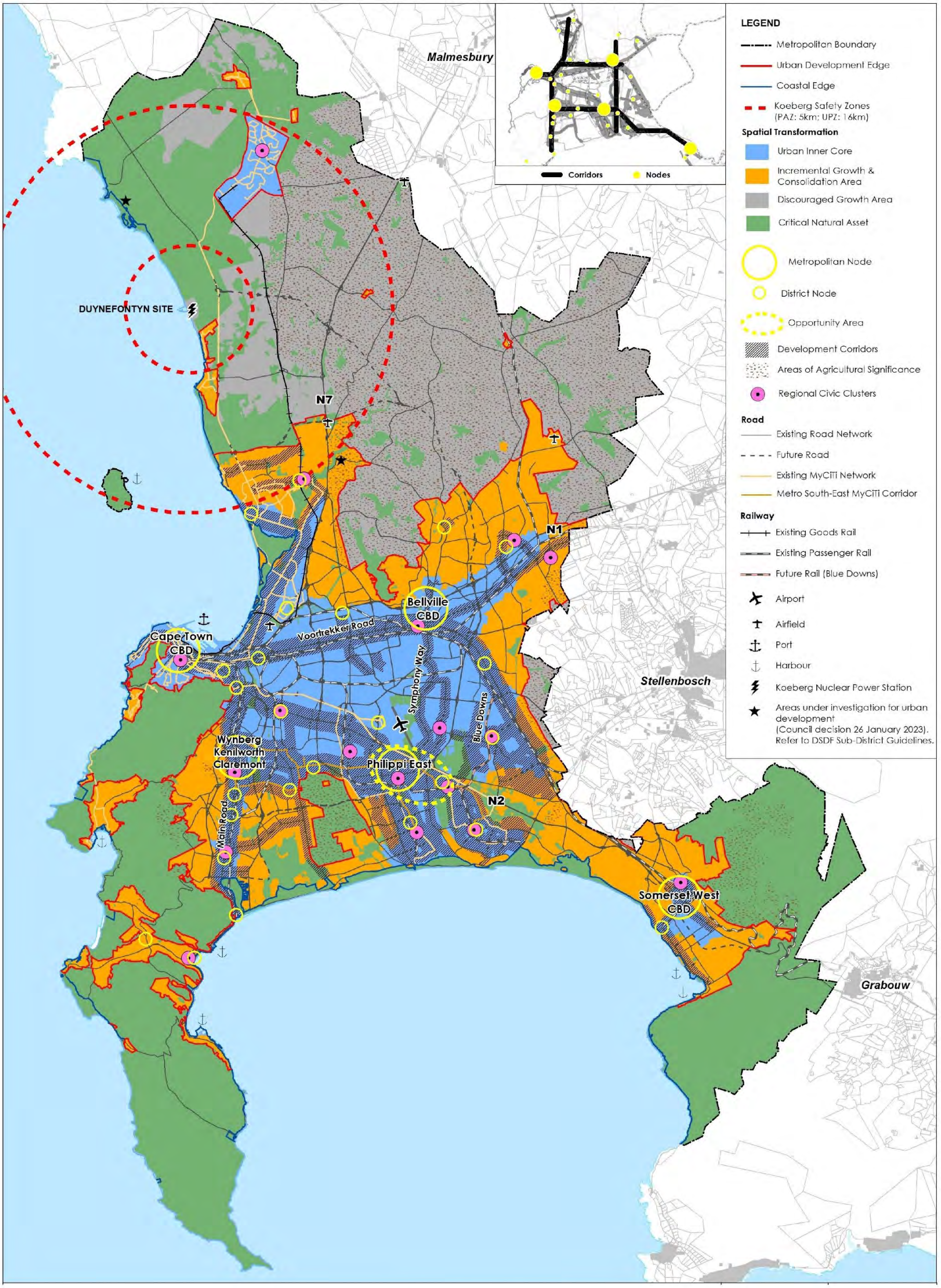
(UPZ) will be subject to Municipal Planning By-Law provisions Section 158: Specific Provision: Koeberg Restriction Area Overlay Zoning.

P16.8 *Any new nuclear power station, nuclear waste facility and associated infrastructure being developed in Cape Town must be located on the Eskom Holdings SOC Limited controlled area at the Koeberg site.*

- *Its exclusion zones must be smaller than, or equal to, the existing KNPS Precautionary Action Zone (PAZ) and Urgent Protection Action Zone (UPZ).*

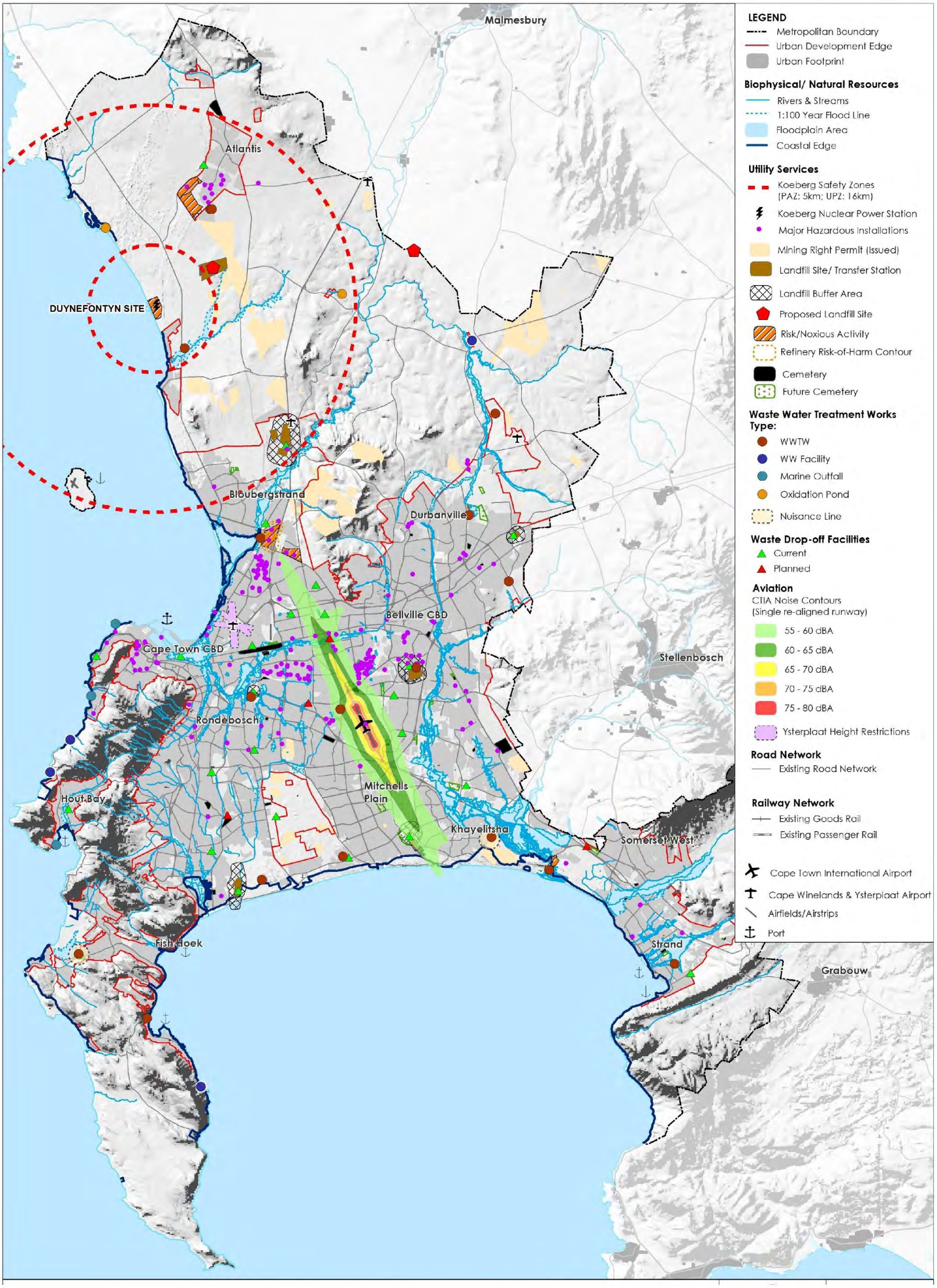
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COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN	
PLANNING PARTNERS			Cape Town Municipal Spatial Development Framework (2023) SOURCE OF INFORMATION: City of Cape Town	REV BY	
				AUTH BY	
COMP	NJ	20/02/2024		DWG NO	REVISION
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.23 / 0
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COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
PLANNING PARTNERS			MSDF Map 5a Precautionary Risk Areas SOURCE OF INFORMATION: City of Cape Town	REV BY		
				AUTH BY		
COMP	NJ	20/02/2024		DWG NO		REVISION
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.24	0
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Blaauwberg District Spatial Development Framework (2023)

The Blaauwberg District Spatial Development Framework (DSDF) (City of Cape Town, 2023b) was informed by the MSDF (2023) to guide spatial development for a 10-year planning horizon. The plan applied the strategies and policies of the MSDF to a district level. The Blaauwberg DSDF is deemed to be a district spatial development framework approved in terms of the City of Cape Town Municipal Planning By-Law, 2015 (City of Cape Town, 2015).

The DSDF contains a composite spatial development plan (refer to ***Drawing 5.4.25*** below). It identifies various spatial development categories (SPCs) that are intended to specify the inherent land use suitability of the city's environmental, cultural and urban landscapes, as well as various structuring elements for the future development of the district.

The spatial plan indicates the existing KNPS 0 km – 5 km EP zone (PAZ) and 5 km – 16 km EP zone (UPZ), which restrict future development within the site vicinity.

The DSDF notes that the 'Koeberg Nuclear Power Station / Safety Zones' guidelines are as follows:

- *"All urban development within the Emergency Planning Zone (0 – 16 km) of the Nuclear reactors (Reference Point X = -52727.4000, Y = -3727966.6500) must conform to the procedural guidance and restrictions reflected in the Development Management Scheme section 158 (Specific Conditions regarding the Koeberg Restriction Area Overlay Zoning)."*

- *"Guidance in points 3 – 5 below will be reviewed once the Regulations for Development around Koeberg is available from the Minister of Mineral Resources and Energy or the review of Item 158 of the City of Cape Town's Development Management Scheme is approved by Council."*

- *"The principle for the 0 – 5 km zone is that no new development will be permitted unless place bound and directly related to the nuclear power station."*

- *"The principle for the 5 – 16 km zone is that limited development will be considered subject to assessments. And that in general the*

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number of permanent population, employees and visitors should be limited."

- *"The City, in association with Eskom, for the National Nuclear Regulator, will develop tools to assess and report on the cumulative impacts of development applications in relation to available evacuation time. Development applications will be assessed through the Traffic Evacuation model."*

- *"Changes in land use outside the existing built up area must consider disaster management infrastructure and operational systems necessary for people on the property to be notified of an evacuation order (i.e. Sirens, information in Home Owners Association Constitution/Rules of the Scheme) and to act on the order."*

- *"Proposals for urban development in the 0 – 16 Koeberg Emergency Planning Zone which is also in the Discouraged Growth Area or outside the urban development edge is discouraged. Agricultural, tourism or recreational related land uses which are compatible with the agricultural or rural zoning could be considered, but will require special attention to nuclear safety and evacuation planning, and implementation of said plans. This should include alert systems, sirens, nearby declared evacuation routes, capacity at mass care centres, and means of notifying owners and all visitors at all times about emergency procedures (e.g. Including information in Home Owners' Association Constitution / Rules of the Scheme etc). Special agreements with the National Nuclear Regulator and Eskom may be required and engagement should happen in the early stages of proposals. These costs are for the developer unless otherwise agreed to by Eskom."*

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Areas under investigation for Urban Development (Council Decision 26 January 2023) Refer to DSDF Sub-District Guidelines

LEGEND

Spatial Planning Categories

- Core Biodiversity
- Core Biodiversity Areas of Coincidence
- Structuring Open Space
- Institutional Structuring Open Space
- Areas of Agricultural Significance
- Waterbodies
- Urban Development
- Industrial Development
- New Development Areas
- Mixed Use Intensification
- Landfill Site/Transfer Station
- Landfill Buffer Area
- Smallholdings
- Risk Industry
- Koeberg Safety Zones

Transport Network

- Freeway
- Rail
- Higher Order Development Order Routes
- Lower Order Development Order Routes
- Connector
- Airfield
- Ysterplaat Height Restrictions

Conceptual Designations

- District Node
- Local Node
- Development Corridor
- Destination Places
- Regional Civic Cluster
- Community Civic Cluster
- Floodline
- Watercourses
- Coastal Edge
- Urban Development Edge
- Municipal Boundary

Mamre Moravian Mission
Pella
ATLANTIS
Atlantis Dunes Gateway
ATLANTIS INDUSTRIAL
Silverstroomstrand
16 Km
5 Km
KOEBERG POWER STATION
Philadelphia
MELKBOSSTRAND
Melkbosstrand
Blaauwberg Nature Reserve
BLOUBERGSTRAND
Big Bay
SUNNINGDALE
DUNOON
Marine Circle
TABLE VIEW
Table Bay Nature Reserve
SUNSET BEACH
MILNERTON
Milnerton Lighthouse
Milnerton Lagoon
CENTURY CITY
Zoar Vlei

*Core Biodiversity includes the City's Bionet categories Core 1 Protected and Conserved Areas and Core 1 Critical Biodiversity Areas- (CBA 1a to 2), these categories represent either protected and conserved natural areas or irreplaceable and endangered biodiversity based on September 2021 spatial data. New development within or impacting these areas are labelled "Areas of Coincidence" and will be subject to the requirements of either future or current environmental authorisation in terms of the Environmental Impact Assessment Regulations, 2014, as amended, (EIA Regulations) under the National Environmental Management Act, 1998 (Act No. 107 of1998) (NEMA) AND/OR conditions relating to development approvals in terms of the City's Development Management Scheme (DMS).

COORDINATE SYSTEM			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter					REV BY	
PLANNING PARTNERS			**Blaauwberg District Spatial Development Framework (2023)**		AUTH BY	
COMP	NJ	20/02/2024	SOURCE OF INFORMATION: City of Cape Town		DWG NO	REVISION
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.25	0
SCALE	NTS					

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City of Cape Town Development Management Scheme (as amended 2019)

The City of Cape Town Development Management Scheme (DMS) is included within the City of Cape Town Municipal Planning By-Law, 2015 as its Schedule 3.

Chapter 19 of the DMS provides for overlay zonings, which overlay zonings provide additional strategic development directives to specific areas identified within the City of Cape Town. Part 2 thereof provides for Density Overlay Zoning.

The Density Overlay Zoning provides a mechanism for designating development density measures to land in order to establish development priorities and strategies as may be identified in the City of Cape Town's approved IDP or spatial plans. The development density measures may include the setting of specific minimum or maximum development densities given the availability of invested infrastructure or lack of available infrastructure, and may also include incentive measures to encourage and support development priorities and strategies.

Section 158 of the DMS provides for the Koeberg Restriction Area Overlay Zoning (refer to ***Drawing 5.4.26***). Section 158 states the following:

"*158 (1) In this item:*

*(a) '**Precautionary Action Zoning Zone (PAZ)**' means land within a 5 km radius from a point defined by the co-ordinates X= -52727,4000 and Y= -3727966,6500 in WGS84 transverse Mercator projection;*

*(b) '**Urgent Protective Action Zone (UPZ)**' means land within a 16 km radius from a point defined by the co-ordinates X= -52727,4000 and Y= -3727966,6500 in WGS84 transverse Mercator projection, but excluding the Precautionary Action Zone (PAZ);*

*(c) '**development application**' means any construction or utilisation of land or any application made to the City for increased use rights in terms of planning legislation or the zoning scheme regulations, other than that which is already permitted in terms of the development management*

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scheme, and which either increases the transitory or permanent population within the Precautionary Action Zone (PAZ) or the Urgent Protective Action Zone (UPZ) and/or which might compromise the effective implementation of the Koeberg Nuclear Emergency Plan.

(2) In the Precautionary Action Zone (PAZ):

(a) no development application shall be approved, except development by the Koeberg nuclear operator ancillary to the siting, design, construction, operation and decommissioning of the Koeberg Nuclear power station in terms of its operating license;

(b) provided land owners may, subject to obtaining the approval of the City, exercise increased use rights which will not result in any transitory or permanent population growth and where the City is satisfied that the disaster management infrastructure necessary to ensure effective implementation of the approved traffic evacuation model and associated disaster risk management procedures, is adequate.

(3) In the Urgent Protective Action Zone (UPZ):

(a) a development application shall only be approved by the City where it is satisfied that the disaster management infrastructure necessary to ensure effective implementation of the approved traffic evacuation model and associated disaster risk management procedures, is adequate;

(b) provided land owners may, subject to obtaining the approval of the City, exercise increased use rights which will not result in any transitory or permanent population growth;

(c) provided in considering development applications for approval in terms of paragraph (a) above, regard shall be had to the following:

(i) estimated existing population and envisaged population growth in the UPZ as a result of the proposed development;

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(ii) impact of envisaged population growth on the effective implementation of the Koeberg Nuclear Emergency Plan and the approved traffic evacuation model;

(iii) capacity of disaster management infrastructure to meet the requirements of the Koeberg Nuclear Emergency Plan in relation to the envisaged population growth;

(iv) any other consideration considered relevant which has the potential to detrimentally impact upon the effective implementation of the Koeberg Nuclear Emergency Plan.

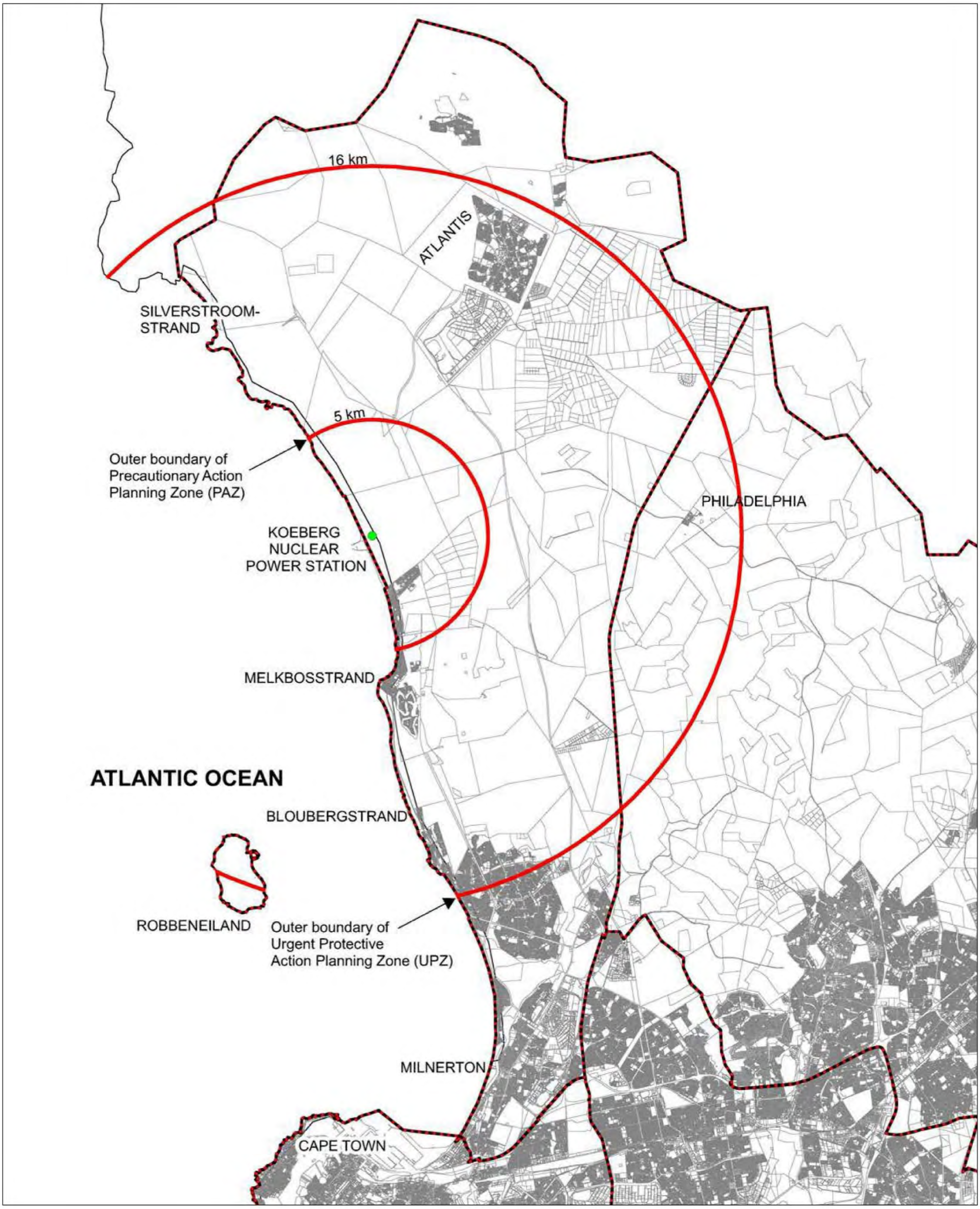
Measures to Control Development around the Site

Development in the vicinity of the nuclear installation(s) must be controlled and/or monitored. This is to ensure that no change of land use occurs within the vicinity which may give rise to activities that may have a detrimental impact on emergency planning or may pose an external threat to the nuclear installation(s).

These requirements need to be incorporated by local authorities within SDFs and strategic planning directives. In this regard and as highlighted above, a number of measures have been incorporated within the City of Cape Town Municipal Spatial Development Framework (2023), the Blaauwberg District Spatial Development Framework (2023) and the City of Cape Town Municipal Planning By-Law, 2015 together with its Development Management Scheme (as amended 2019).

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BOUNDARY OF KOEBERG RESTRICTION AREA

NOTE: FOR MORE DETAILED INFORMATION REFER TO THE DIRECTOR: PLANNING & BUILDING DEVELOPMENT MANAGEMENT

COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN		
PLANNING PARTNERS			KOEBERG RESTRICTION AREA OVERLAY ZONING SOURCE OF INFORMATION: City of Cape Town		REV BY	
					AUTH BY	
COMP	NJ	07/05/2021			DWG NO	REVISION
REV			RELEASED BY ESKOM	NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.26	0
SCALE	NTS					

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5.4.11 Habits Survey

An habits survey was undertaken for this update of the DSSR, and is reported on in ***Chapter 7*** of the SSR.

in 2023/2024

5.4.12 Demography in Emergency Planning Zones

5.4.12.1 Population Distribution

This subsection presents demographic data in terms of the emergency planning zones[12] (EP zones) that apply to the site, as defined in ***Chapter 8*** (EP).

The purpose of the site characterisation is to inform emergency planning and remedial measures that must be considered to minimise the preliminary estimation of public exposure in case of a potential radiological incident or accident.

In accordance with the Eskom Position Paper on Emergency Planning Zones for New Nuclear Installations (Eskom, 2009), demographic data were presented for the PAZ (0 – 5 km), UPZ (5 – 16 km) and LPZ (16 – 80 km), as defined in ***Chapter 8*** (EP).

Data presented for population distribution inform evacuation, shelter, thyroid blocking, temporary relocation, on-going monitoring and public communication (Eskom, 2009).

Data presented for gender, age and dwelling type inform evacuation, shelter, thyroid blocking and temporary relocation only (Eskom, 2009).

Current Distribution

The permanent population distribution for 2018 is presented in ***Drawings 5.4.13*** and ***5.4.14*** and ***Appendices 5.4.L*** and ***5.4.M***. The maximum cumulative population distribution for 2018 is presented in ***Drawings 5.4.19*** and ***5.4.20*** and ***Appendices 5.4.O*** and ***5.4.P***.

[12] Emergency Planning Zones represent areas in which planning for given protective actions must take place. The zones, as well as the required actions in the respective zones, are to be based on the consequences due to possible accidents which should be determined from a hazard assessment and a plant-specific risk analysis where relevant (National Nuclear Regulator, 2012).

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2018

0 km – 5 km EP Zone (PAZ)

It is estimated that this EP zone had a permanent population (2018) of approximately 6 720 persons.

The largest portion of this population (approximately 6 520 persons) is located in the east-southeast, southeast and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Duynefontein, Van Riebeeckstrand and Melkbosstrand.

The estimated total cumulative population (2018) within this EP zone was approximately 7 010 persons.

As with the permanent population, the largest portion of this total cumulative population (approximately 6 800 persons) is located in the east-southeast, southeast and south-southeast sectors.

5 km – 16 km EP Zone (UPZ)

It was estimated that this EP zone had a permanent population (2018) of approximately 136 660 persons.

The largest portion of this permanent population (approximately 79 640 persons) is located in the north-northeast sectors. These sectors correspond with portions of the neighbourhoods of Atlantis.

A substantial portion of the permanent population of this EP zone (approximately 40 700 persons) is also located in the south and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Melkbosstrand, Bloubergstrand, West Beach, Sunningdale and Parklands.

The estimated total cumulative population (2018) within this EP zone was approximately 142 470 persons.

As with the permanent population, the largest portion of this total cumulative population (approximately 83 030 persons) is located in the north-northeast sector.

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As with the permanent population, a substantial portion of the total cumulative population of this EP zone (approximately 42 430 persons) is located in the south and south-southeast sectors.

16 km – 80 km EP Zone (LPZ)

It was estimated that this EP zone had a permanent population (2018) of approximately 4 984 660 persons.

The largest population concentrations are in an east-southeast, southeast, south-southeast and south direction from the site, coinciding with urban settlements within the City of Cape Town. In addition, the population distribution shows spikes around main towns.

The estimated total cumulative population (2018) within this EP zone was approximately 5 170 310 persons.

As with the permanent population, total cumulative population concentrations correspond with urban settlements within the City of Cape Town towards the east-southeast, southeast, south-southeast and south and the main towns outside of the City of Cape Town.

Projected Distribution

The projected permanent population distribution for 2026, 2046 and 2096 is presented in ***Appendix 5.4.L*** and ***5.4.M***. The projected permanent population distribution for 2096 is also presented in ***Drawings 5.4.15*** and ***5.4.16***.

The projected maximum cumulative population distribution for 2026, 2046 and 2096 is presented in ***Appendices 5.4.O*** and ***5.4.P***. The projected maximum cumulative population distribution for 2096 is also presented in ***Drawings 5.4.21*** and ***5.4.22***.

2026

0 km – 5 km EP Zone (PAZ)

A permanent population of approximately 8 830 persons has been projected for this EP zone by 2026.

The largest portion of this population (approximately 8 510 persons) is located in the east-southeast, southeast and south-southeast sectors.

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These sectors correspond with portions of the neighbourhoods of Duynefontein, Van Riebeeckstrand and Melkbosstrand.

A total cumulative population of approximately 9 200 persons has been projected for this EP zone for 2026.

As with the permanent population, the largest portion of this total cumulative population (approximately 8 870 persons) is located in the east-southeast, southeast and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Duynefontein, Van Riebeeckstrand and Melkbosstrand.

The projected number of persons indicated above is based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection). However, development in the vicinity of the nuclear installation(s) must be monitored and controlled, with special mention of the PAZ. This is to ensure that no change of land use occurs within the vicinity of the nuclear installation(s) which may give rise to population numbers or activities that may have a detrimental impact on emergency planning.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the MSDF (2018), the Blaauwberg District Plan (2012) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

5 km – 16 km EP Zone (UPZ)

A permanent population of approximately 175 650 persons has been projected for this EP zone by 2026.

The largest portion of this permanent population (approximately 98 200 persons) is located in the north-northeast sectors. These sectors correspond with portions of the neighbourhoods of Atlantis.

A substantial portion of the permanent population of this EP zone (approximately 61 210 persons) is also located in the south and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Melkbosstrand, Bloubergstrand, West Beach, Sunningdale and Parklands.

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A total cumulative population of approximately 183 120 persons has been projected for this EP zone by 2026.

As with the permanent population, the largest portion of this total cumulative population (approximately 102 390 persons) is located in the north-northeast sectors.

As with the permanent population, a substantial portion of the total cumulative population of this EP zone (approximately 74 380 persons) is located in the south and south-southeast sectors.

The projected number of persons indicated above is based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection). However, development in the vicinity of the nuclear installation(s) must be monitored and controlled, with special mention of the UPZ. This is to ensure that no change of land use occurs within the vicinity of the nuclear installation(s) which may give rise to population numbers or activities that may have a detrimental impact on emergency planning.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the MSDF (2018), the Blaauwberg District Plan (2012) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

16 km – 80 km EP Zone (LPZ)

A permanent population of approximately 5 950 140 persons has been projected for this EP zone by 2026.

The largest population concentrations are in an east-southeast, southeast, south-southeast and south direction from the site, coinciding with urban settlements within the City of Cape Town. In addition, the population distribution shows spikes around main towns.

A total cumulative population of approximately 6 170 340 persons has been projected for this EP zone by 2026.

As with the permanent population, total cumulative population concentrations correspond with urban settlements within the City of Cape

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Town towards the east-southeast, southeast, south-southeast and south and the main towns outside of the City of Cape Town.

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2046

0 km – 5 km EP Zone (PAZ)

A permanent population of approximately 12 970 persons has been projected for this EP zone by 2046.

The largest portion of this population (approximately 12 530 persons) is located in the east-southeast, southeast and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Duynefontein, Van Riebeeckstrand and Melkbosstrand.

A total cumulative population of approximately 13 520 persons has been projected for this EP zone for 2046.

As with the permanent population, the largest portion of this total cumulative population (approximately 13 060 persons) is located in the east-southeast, southeast and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Duynefontein, Van Riebeeckstrand and Melkbosstrand.

The projected number of persons indicated above is based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection). However, development in the vicinity of the nuclear installation(s) must be monitored and controlled, with special mention of the PAZ. This is to ensure that no change of land use occurs within the vicinity of the nuclear installation(s) which may give rise to population numbers or activities that may have a detrimental impact on emergency planning.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the MSDF (2018), the Blaauwberg District Plan (2012) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

5 km – 16 km EP Zone (UPZ)

A permanent population of approximately 272 740 persons has been projected for this EP zone by 2046.

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The largest portion of this permanent population (approximately 144 560 persons) is located in the north-northeast sectors. These sectors correspond with portions of the neighbourhoods of Atlantis.

A substantial portion of the permanent population of this EP zone (approximately 101 945 persons) is also located in the south and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Melkbosstrand, Bloubergstrand, West Beach, Sunningdale and Parklands.

A total cumulative population of approximately 284 330 persons has been projected for this EP zone by 2046.

As with the permanent population, the largest portion of this total cumulative population (approximately 150 720 persons) is located in the north-northeast sectors.

As with the permanent population, a substantial portion of the total cumulative population of this EP zone (approximately 124 380 persons) is located in the south and south-southeast sectors.

The projected number of persons indicated above is based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection). However, development in the vicinity of the nuclear installation(s) must be monitored and controlled, with special mention of the UPZ. This is to ensure that no change of land use occurs within the vicinity of the nuclear installation(s) which may give rise to population numbers or activities that may have a detrimental impact on emergency planning.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the MSDF (2018), the Blaauwberg District Plan (2012) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

16 km – 80 km EP Zone (LPZ)

A permanent population of approximately 8 396 670 persons has been projected for this EP zone by 2046.

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The largest population concentrations are in an east-southeast, southeast, south-southeast and south direction from the site, coinciding with urban settlements within the City of Cape Town. In addition, the population distribution shows spikes around main towns.

A total cumulative population of approximately 8 706 680 persons has been projected for this EP zone by 2046.

As with the permanent population, total cumulative population concentrations correspond with urban settlements within the City of Cape Town towards the east-southeast, southeast, south-southeast and south and the main towns outside of the City of Cape Town.

2096

0 km – 5 km EP Zone (PAZ)

A permanent population of approximately 34 900 persons has been projected for this EP zone by 2096.

The largest portion of this population (approximately 33 970 persons) is located in the east-southeast, southeast and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Duynefontein, Van Riebeeckstrand and Melkbosstrand.

A total cumulative population of approximately 36 380 persons has been projected for this EP zone for 2096.

As with the permanent population, the largest portion of this total cumulative population (approximately 35 410 persons) is located in the east-southeast, southeast and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Duynefontein, Van Riebeeckstrand and Melkbosstrand.

The projected number of persons indicated above is based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection). However, development in the vicinity of the nuclear installation(s) must be monitored and controlled, with special mention of the PAZ. This is to ensure that no change of land use occurs within the vicinity of the nuclear installation(s) which may give rise to population numbers or activities that may have a detrimental impact on emergency planning.

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As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the MSDF (2018), the Blaauwberg District Plan (2012) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

5 km – 16 km EP Zone (UPZ)

A permanent population of approximately 742 850 persons has been projected for this EP zone by 2096.

The largest portion of this permanent population (approximately 349 860 persons) is located in the north-northeast sectors. These sectors correspond with portions of the neighbourhoods of Atlantis.

A substantial portion of the permanent population of this EP zone (approximately 271 760 persons) is also located in the south and south-southeast sectors. These sectors correspond with portions of the neighbourhoods of Melkbosstrand, Bloubergstrand, West Beach, Sunningdale and Parklands.

A total cumulative population of approximately 774 440 persons has been projected for this EP zone by 2096.

As with the permanent population, the largest portion of this total cumulative population (approximately 364 740 persons) is located in the north-northeast sectors.

As with the permanent population, a substantial portion of the total cumulative population of this EP zone (approximately 283 320 persons) is located in the south and south-southeast sectors.

The projected number of persons indicated above is based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection). However, development in the vicinity of the nuclear installation(s) must be monitored and controlled, with special mention of the UPZ. This is to ensure that no change of land use occurs within the vicinity of the nuclear installation(s) which may give rise to population numbers or activities that may have a detrimental impact on emergency planning.

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As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the MSDF (2018), the Blaauwberg District Plan (2012) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

16 km – 80 km EP Zone (LPZ)

A permanent population of approximately 20 816 760 persons has been projected for this EP zone by 2096.

The largest population concentrations are in an east-southeast, southeast, south-southeast and south direction from the site, coinciding with urban settlements within the City of Cape Town. In addition, the population distribution shows spikes around main towns.

A total cumulative population of approximately 21 589 300 persons has been projected for this EP zone by 2096.

As with the permanent population, total cumulative population concentrations correspond with urban settlements within the City of Cape Town towards the east-southeast, southeast, south-southeast and south and the main towns outside of the City of Cape Town.

Table 5.4.31 below provides a summary of the permanent population and the total cumulative population in emergency planning zones, as well as the 80 km radius, for 2018, 2026, 2046 and 2096.

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Table 5.4.31
Summary of Population in Emergency Planning Zones and Total Population in the Region (2018, 2026, 2046 and 2096)

Year	Population per Emergency Planning Zone			
	PAZ (0 - 5 km)	UPZ (5 - 16 km)	LPZ (16 - 80 km)	80 km Radius (0 - 80 km)
Permanent Population				
2018	6 720	136 660	4 984 660	5 128 040
2026	8 830	175 650	5 950 140	6 134 620
2046	12 970	272 740	8 396 670	8 682 380
2096	34 900	742 850	20 816 760	21 594 510
Total Cumulative Population				
2018	7 010	142 470	5 170 310	5 319 790
2026	9 200	183 120	6 170 340	6 362 660
2046	13 520	284 330	8 706 680	9 004 530
2096	36 380	774 440	21 589 300	22 400 120

Gender

Population characteristics for gender (refer to ***Appendix 4.5.F***) within EP zones in the vicinity of the site (i.e. 16 km radius) are presented below and illustrated in ***Drawing 5.4.27***.

0 km – 5 km EP Zone (PAZ)

Of the approximate 3 610 persons residing in the 0 km to 5 km EP zone in 2011, approximately 1 850 persons (51 percent) are female and 1 757 persons (49 percent) are male. The gender distribution in this zone demonstrates a slightly higher percentage of females present. This is similar to the gender distribution determined for the 16 km radius, which presents 51 percent females and 49 percent males [refer to ***Subsection 5.4.5.1*** (Current Permanent Population)].

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5 km – 16 km EP Zone (UPZ)

Of the approximately 109 000 persons residing in the 5 km to 16 km EP zone in 2011, approximately 55 820 persons (51 percent) are female and 53 180 persons (49 percent) are male. The gender distribution in this zone demonstrates a slightly higher percentage of females present. This is similar to the gender distribution determined for the 5 km radius, which presents 51 percent females and 49 percent males [refer to ***Subsection 5.4.5.1*** (Current Permanent Population)].

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-3710000 -3720000 -3730000 -3740000 -3750000

GROTTO BAY
MAMRE
MAMRE
GREATER CHATSWORTH
PELLA-KATZENBERG
CHATSWORTH
WESFLEUR
ATLANTIS INDUSTRIAL
BLAAUWBERG
R304
N7
16km
5km
R27
DUYNEFONTYN SITE
PHILADELPHIA
Total Population:3606
Male:1757
Female:1849
MELKBOSCH STRAND
M19
NORTHERN
Total Population: 108998
Male: 53181
Female: 55817
BLAAUWBERGSTRAND
MILNERTON
BIG BAY
Robben Island
PARKLANDS
MILNERTON
RICHMOND PARK
BURGUNDY

Legend
- 5km EPZ
- 16km EPZ
- Roads
- Railways
- City of Cape Town Districts
- Local Municipalities (LM)
- Magisterial Districts (MD)
- Allotment Townships

N W E S

0 0.5 1 2 3 4 5
Kilometers

COORDINATE SYSTEM Map projection: Gauss Conformal Datum: Hartebeeshoek 94 Spheroid: WGS84 Scale factor: 1 Central meridian: LO19 Units: International meter			Eskom	SITE SAFETY REPORT FOR DUYNEFONTYN	
PLANNING PARTNERS			POPULATION AND GENDER PER EP ZONE UP TO 16 KM (2011)	REV BY	
				AUTH BY	
COMP	NJ	02/06/2021	SOURCE OF INFORMATION: STATS SA (2011 Census)	DWG NO	REVISION
REV			RELEASED BY ESKOM / NOTE: For proper clarity this drawing must be printed at A3 scale.	5.4.27	0
SCALE	1:120 000				

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5.4.12.2 Special Population Groups

Homes for the Aged

There are no homes for the aged (2020) located in either the 0 km to 5 km EP zone or the 5 km to 16 km EP zone.

The nearest home for the aged is Communicare: Kent Durr, which has 180 residents and is located at 22.8 km south-southeast (refer to ***Drawing 5.4.11***).

Homes for the Disabled

There are no homes for the disabled (2020) located in the 0 km to 5 km EP zone.

Two homes for the disabled are located within the 5 km to 16 km EP zone (refer to ***Drawing 5.4.11***). These homes are located at 13.7 km north-northeast (i.e. Orion) and 15.6 km northeast (i.e. Camphill Village) respectively. Orion has 60 residents and Camphill Village has 92 residents (2020).

Children's Homes

There are no children's homes (2020) located in either the 0 km to 5 km EP zone or the 5 km to 16 km EP zone.

The closest children's home is Durbanville Children's Home at 26.5 km southeast with 144 children (refer to ***Drawing 5.4.11***).

Prisons

There are no prisons (2020) located in either the 0 km to 5 km EP zone or the 5 km to 16 km EP zone.

The closest prison is the Goodwood Correctional Centre located at 25.4 km south-southeast (refer to ***Drawing 5.4.11***) that has a capacity of 2 115 prisoners (actual number was 2 438 prisoners in 2020).

Hospitals and Clinics

There are no hospitals (2020) located in the 0 km to 5 km EP zone.

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Two hospitals are located within the 5 km to 16 km EP zone (refer to ***Drawing 5.4.12***). These are the Wesfleur Hospital in Atlantis (13.8 km north-northeast) with 50 beds and the Blaauwberg Netcare (14.9 km south-southeast) with 180 beds.

There are 45 hospitals located in the 16 km to 80 km EP zone. These 45 hospitals have a combined number of 11 465 beds (refer to ***Drawing 5.4.12***).

There are 2 clinics located in the 0 km to 5 km EP zone, but there are no clinics located in the 5 km to 16 km EP zone (2020).

The closest clinic is the Seapark Clinic located at 4.5 km south-southeast (refer to ***Drawing 5.4.11***).

Education Facilities

Universities

There are no universities (2018) located in either the 0 km to 5 km EP zone or the 5 km to 16 km EP zone.

There are four universities located in the 16 km to 80 km EP zone (refer to ***Drawing 5.4.12***). These are the Cape Peninsula University of Technology with approximately 34 220 students located at 28.1 km south, the University of Cape Town with approximately 28 700 students located at 31.3 km south, the University of the Western Cape with approximately 22 840 students located at 33.8 km south-southeast and the University of Stellenbosch with approximately 31 260 students located at 49.1 km southeast.

Schools

There is one school (2018) within the 0 km to 5 km EP zone (refer to ***Drawing 5.4.12***). This is the Van Riebeeckstrand Primary School at 3.4 km south-southeast with 1 123 learners.

There are a total of 30 schools located within the 5 km to 16 km EP zone. These 30 schools have a combined total of approximately 22 930 learners (2018).

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There are a total of 1 111 schools located within the 16 km to 80 km EP zone. These 1 111 schools had a combined total of approximately 833 150 learners (2018).

Day-care Centres/Early Childhood Development Centres

There is one day-care centre located in the 0 km to 5 km EP zone (2018). This is the Babbel en Krabbel day-care centre at 4.8 km south-southeast with 57 children (refer to ***Drawing 5.4.11***).

There are 5 day-care centres located in the 5 km to 16 km EP zone with a combined total of 247 children.

Informal Settlements

The data indicate that one informal settlement is located in the 0 km to 5 km EP zone (refer to ***Drawing 5.4.11***). This is the Kleinzouterivier settlement at 3.0 km south-southeast, with approximately 25 informal dwellings (2023).

The data indicate that there are 16 informal settlements located in the 5 km to 16 km EP zone. These 16 informal settlements have a combined total of approximately 4 996 informal dwellings (2023).

Table 5.4.32 below provides a summary of special population groups in the PAZ, UPZ, 35 km radius and 80 km radius.

Table 5.4.32
Summary of Special Population Groups in PAZ, UPZ, 35 km Radius and 80 km Radius

Special Population Group		Number of Facilities, Residents, Children, Prisoners, Beds, Students, Informal Settlements and Informal Dwellings per specified Annulus or Radius				Nearest Facility
		PAZ (0 - 5 km)	UPZ (5 - 16 km)	35 km Radius	80 km Radius	
Homes for the Aged (2020)	Facilities	0	0	60	-	Communicare: Kent Durr, 180 residents, 22.8 km south-southeast
	Residents	0	0	5 277	-	
Homes for the Disabled (2020)	Facilities	0	2	13	-	Orion, 60 residents, 13.7 km north-northeast
	Residents	0	152	550	-	

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Special Population Group		Number of Facilities, Residents, Children, Prisoners, Beds, Students, Informal Settlements and Informal Dwellings per specified Annulus or Radius				Nearest Facility
		PAZ (0 - 5 km)	UPZ (5 - 16 km)	35 km Radius	80 km Radius	
Children's Homes (2020)	Facilities	0	0	21	-	Durbanville Children's Home, 144 children, 26.5 km southeast
	Children	0	0	1 059	-	
Prisons (2020)	Facilities	0	0	1	-	Goodwood Correctional Centre, 2 438 prisoners, 25.4 km south-southeast
	Prisoners	0	0	2 438	-	
Clinics (2020)	Facilities	2	0	36	-	Seapark Clinic, 4.5 km south-southeast
Hospitals (2020)	Facilities	0	2	26	47	Wesfleur Hospital, 50 beds, 13.8 km north-northeast
	Beds	0	230	7 788	11 695	
Universities (2018)	Facilities	0	0	3	4	Cape Peninsula University of Technology, 34 220 students, 28.1 km south
	Students	0	0	85 760	117 018	
Schools (2018)	Facilities	1	30	252	1 142	Van Riebeeckstrand Primary School, 1 123 children, 3.4 km south-southeast
	Children	1 123	22 930	176 179	857 208	
Day-care Centres (2018)	Facilities	1	5	102	-	Babbel en Krabbel, 57 children, 4.8 km south-southeast
	Children	57	247	5 668	-	
Informal Settlements (2023)	Settlements	1	16	44	-	Kleinzouterivier, 25 structures, 3.0 km south-southeast
	Dwellings	25	4 996	27 441	-	

5.4.13 Management of Uncertainties

The evaluation of demographic characteristics of the site involves the following uncertainties:

Population Projections

For spatial planning purposes in South Africa, population projections and its distribution are normally undertaken for a maximum period of 20 years. This constitutes best practice as various factors influence

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population data and growth within a particular geographical region. Such factors include, *inter alia*, fertility rates, birth rates, infection rates of HIV/AIDS and tuberculosis, death rates, migration, government policies and spending (e.g. economic policies, spatial policies such as the identification of new development nodes). These factors fluctuate over time and cannot be reliably foreseen over long periods. Subsequently, the reliability of population projections and its distribution based on the 2011 census decreases over time.

As population data and growth rates are to a large extent dependant on variable factors, it is essential to update or confirm population distribution data and projected population data on a regular basis, e.g. shortly after the completion of national censuses.

Tourist Data and Projections

The tourist calculations are based on available data (2015 to 2019 period), projections, estimates and assumptions. The reliability of these data and associated projections will decrease over time and therefore periodic review and update of these estimates will be needed during the lifetime of the nuclear installation(s).

Due to the outbreak of the worldwide COVID-19 pandemic and subsequent national government regulations pertaining to restrictions on the movement of people and restrictions on the interaction between people, the methodology for determining the tourist population (EDGE Tourism Solutions, 2017) could not be followed. Should circumstances permit, the 2017 methodology should be implemented during the next update of the DSSR to achieve a better degree of weighted tourism distribution.

Transient Nodes and Recreational Destinations

When sourcing data for main transient nodes, not all participants are always willing to participate (e.g. shopping centres). A limited number of gaps in data may therefore be expected from time to time. Tourism in the region is directly linked to coastal facilities, places of natural and historic interest and conservation areas. It is envisaged that these established facilities and places of interest will continue to be the focus of recreational destinations.

It is however, not possible to project with reliable accuracy the number, location and capacity of future/new transient nodes and recreational

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destinations and venues. Periodic review and update of data will be needed during the lifetime of the nuclear installation(s).

Special Population Groups

When sourcing data for special population groups, not all participants are always willing to participate (e.g. homes for the aged, children's homes, ECDCs). A limited number of gaps in data may therefore be expected from time to time. Further, it is not possible to project, with any accuracy, the number and location of future/new special population groups. Periodic review and update of data will be needed during the lifetime of the nuclear installation(s).

Spatial Planning

Authorities must regularly review forward planning documents and frameworks (approximately every five to ten years). As government policies, investment opportunities and community needs may change over time, spatial development frameworks may undergo amendments.

Habits Survey

A habits survey was undertaken for this update of the DSSR in 2023/24. The outcomes of the survey are reported on in ***Chapter 7*** of the SSR. .

Projected Population within the PAZ and UPZ

The projected number of persons within the PAZ and UPZ is based on current growth trends identified in ***Subsection 5.4.8.1*** (Permanent Population Projection). However, development in the vicinity of the nuclear installation(s) must be monitored and controlled, with special mention of the PAZ and UPZ.

As indicated in ***Subsection 5.4.10.2*** (Projected Regional Activities and Measures to Control Development around the Site), a number of measures have been incorporated within the MSDF (2018), the Blaauwberg District Plan (2012) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

5.4.14 Monitoring

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Following legal requirements and guideline documents as contained in ***Subsection 5.4.3*** (Regulatory Framework), information on existing and projected population distributions in the site region, including resident populations and to the extent possible, transient populations, are envisaged to be collected and kept up to date over the life of the nuclear installation(s).

5.4.14.1 Pre-operational

Population Projections

It is essential to update or confirm population distribution data and projected population figures on a regular basis, e.g. shortly after the completion of national censuses.

Tourist Data and Projections

It is recommended that the tourist population and projections be periodically reviewed and updated. This should be carried out at the time of the review and update of permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

Transient Nodes and Recreational Destinations

The number, location and capacity of existing and future transient nodes and recreational destinations and venues should be periodically reviewed and updated. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

Special Population Groups

The number and location of existing and future special population groups should periodically be reviewed and updated. This should be carried out at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

Spatial Planning

It is essential to ensure that the requirements and needs of the nuclear installation(s) are considered and accounted for by local authorities in

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strategic planning directives, SDFs and applicable by-laws when these are periodically updated or amended.

Population within the PAZ and UPZ

Projected populations within the PAZ and UPZ must be monitored and controlled to ensure change of land use within the site vicinity is evaluated for its potential impact on emergency planning.

5.4.14.2 Operational

Population Projections

It is essential to update or confirm population distribution estimates and projected population data throughout the nuclear installation lifetime on a regular basis, e.g. shortly after the completion of national censuses.

Tourist Data and Projections

Tourist population numbers and projections should periodically be reviewed and updated throughout the nuclear installation lifetime. This should be carried out at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

Transient Nodes and Recreational Destinations

The number, location and capacity of existing and future transient nodes and recreational destinations and venues should be periodically reviewed and updated throughout the nuclear installation lifetime. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

Special Population Groups

The development of existing and future special population groups in terms of their number and location should periodically be reviewed and updated throughout the nuclear installation lifetime. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

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Spatial Planning

It is essential to ensure that the requirements and needs of the nuclear installation(s) are considered and taken into account by local authorities in strategic planning directives, SDFs and applicable by-laws when these are periodically updated or amended.

Population within the PAZ and UPZ

Projected populations within the PAZ and UPZ must be monitored and controlled to ensure change of land use within the site vicinity is evaluated for its potential impact on emergency planning.

5.4.14.3 Post Operational

As for the operational stage of the nuclear installation(s), the same demographic data should be monitored in the vicinity of the site (e.g. 16 km). The scope and focus of the monitoring will depend on the level of contamination of the site and the end state of decommissioning, e.g. restricted use (e.g. temporary storage of waste) or unrestricted release from regulatory control (e.g. use for farming or residential area).

These and other considerations should be taken into account in strategic planning directives, SDFs and applicable by-laws.

5.4.15 Management System

The assessment of present and future demographic characteristics around the nuclear installation(s) entailed the following components (Eskom, 2014) (Eskom, 2022b):

- desktop studies;
- site investigations;
- data assessment and reporting;
- use of computer software, in particular excel sheets and GIS, for collating, interpretation and presentation of data;
- mapping and creation of a GIS database.

Table 5.4.33 below summarises the activities that were carried out with

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their respective links to other DSSR sections / chapters and quality control requirements.

Table 5.4.33
Summary of Activities, Links and Quality Requirements

Activity	Links		Quality Requirements
	Inputs	Outputs	
Population distribution	***Section 5.1*** (Geography) and ***Chapter 9*** (Physical Protection and Security): Provision of site centroid.	***Chapter 7*** (PRIPE): Information utilised for evaluations. ***Chapter 8*** (EP): Information is utilised as input in EP.	Officially accepted data sources; Drawings and tables illustrating population distribution per sector; Peer review.
Population projections	***Section 5.5*** (Land and Water Use): Land use distribution and SDFs.	***Chapter 7*** (PRIPE): Information utilised for evaluations. ***Chapter 8*** (EP): Information is utilised as input in EP.	Officially accepted data sources; Drawings and tables illustrating population distribution per sector; Peer review.
Transient population	***Section 5.5*** (Land and Water Use), ***Section 5.6*** (Adjacent Sea Use) and ***Section 5.7*** (Nearby Transportation, Industrial and Military Facilities): Identification and information regarding recreational facilities, resorts and other tourist destinations as well as shopping centres.		Tables and drawings illustrating information; Peer review.
Special population groups	***Section 5.5*** (Land and Water Use), ***Section 5.6*** (Adjacent Sea Use) and ***Section 5.7*** (Nearby Transportation, Industrial and Military Facilities): Identification and information regarding special population groups and institutional facilities.	***Chapter 8*** (EP): Information is utilised as input in EP.	Tables and drawings illustrating information; Peer review.

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Activity	Links		Quality Requirements
	Inputs	Outputs	
Regional activities	***Section 5.5*** (Land and Water Use), ***Section 5.6*** (Adjacent Sea Use) and ***Section 5.7*** (Nearby Transportation, Industrial and Military Facilities): Identification and information regarding existing and projected site region activities.	***Chapter 7*** (PRIPE): Identification of activities.	Discussion, tables and drawings illustrating information; Peer review.
EP zones	***Chapter 9*** (Physical Protection and Security): Exclusion Area Plant Parameter Envelope		Drawings illustrating demography in emergency planning zones.

A quality assurance programme for demography evaluation was established to control the effectiveness of the execution of the site investigation and data analysis. This conforms to the overall management system for this DSSR (refer to ***Chapter 10***, Management System). It also applies the appropriate NNR grading for safety classification of SSR related activities and processes (National Nuclear Regulator, 2008) and Eskom's safety classification procedure (Eskom, 2021b). The characterisation of demography has been determined as Safety Level 3 and Quality Level 3.

A regulatory compliance matrix (***Table 5.4.34***) is presented below, which confirms that the regulatory requirements with respect to population demographics and the population projections have been met in this section of this DSSR.

Table 5.4.34
Regulatory Compliance Matrix

Act / Regulation	Regulation	Issue	Section Where Covered
Licensing Regulations (Department of Energy, 2011)	5(3)(d)	Population demographics	***Subsections 5.4.5, 5.4.6, 5.4.7*** and ***5.4.9***

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Act / Regulation	Regulation	Issue	Section Where Covered
Licensing Regulations (Department of Energy, 2011)	5(3)(f)	Projections for the design life of the nuclear installation(s)	***Subsections 5.4.8*** and ***5.4.9***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	6.1(c)	Population density and distribution	***Subsections 5.4.4, 5.4.5, 5.4.6, 5.4.7, 5.4.8, 5.4.9*** and ***5.4.12***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.1	Region of interest to include the area surrounding the site and the EPZ	***Subsection 5.4.4***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.2	Distribution of the population within the region should be determined within 16 sectors of 22.5° each	***Subsection 5.4.4***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.3	Most recent census data for the region should be used in obtaining population distribution	***Subsections 5.4.4.2*** and ***5.4.5***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.4	In the absence of reliable data, a special study should be carried out to determine the population in the region	***Subsections 5.4.6*** and ***5.4.7***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.7	Size of population centres within the low population zone should be limited so that there is a reasonable probability that appropriate protective measures could be taken in the event of a serious accident	***Chapter 8*** ***Subsection 5.4.10.2***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.8	Projected changes in the population should cover the life of the plant and take into account already approved developments and regional plans	***Subsections 5.4.8, 5.4.9*** and ***5.4.10.2***

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Act / Regulation	Regulation	Issue	Section Where Covered
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.9	Data on the present population in the region should be obtained from local authorities or by means of special field surveys and these data should be as accurate and as up to date as possible. The term 'present population' includes the two categories of permanent population and temporary population	***Subsection 5.4.4***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.10	Information on the permanent population	***Subsection 5.4.11***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.11	Information of the temporary population should cover the short-term transient population, such as tourists, and long-term transient population, such as seasonal inhabitants	***Subsections 5.4.6*** and ***5.4.7***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.12	The maximum size of the temporary population and its periods of occupancy in the low population zone should be estimated. Particular types of institutions such as schools, hospitals and prisons within the zone should be identified for the purposes of emergency planning. In the area outside the zone, estimates of the approximate size of the temporary population together with its periods of occupancy should be made	***Subsections 5.4.6***, ***5.4.7, 5.4.8.4*** and ***5.4.12***

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Act / Regulation	Regulation	Issue	Section Where Covered
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.13	Projection of the present population in the region should be made for the expected year of commissioning of the plant and selected years (e.g. every tenth year) over the lifetime of the plant	***Subsections 5.4.8*** and ***5.4.9***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.14	Projections should be made on the basis of population growth rate, migration trends and plans for possible development in the region. The projected figures for permanent population and temporary population should be extrapolated separately if data are available	***Subsections 5.4.8*** and ***5.4.10***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.15	Data should be analysed to give both the current and the projected population distribution in terms of direction and distance from the plant	***Subsections 5.4.5, 5.4.8*** and ***5.4.9***
Regulatory Guide RG-0011 (National Nuclear Regulator, 2016)	8.5.17	Population data collected should be presented in a suitable format and scale to permit correlation with other relevant data, such as data on atmospheric dispersion and on uses of land and water. Additional details should be given for areas closer to the site, especially within the low population zone	***Subsections 5.4.4.1*** and ***5.4.4.3***

The activities carried out as part of the analysis and evaluation of the demography and the results achieved are presented and described in

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this section of this DSSR.

The databases are referenced in this section and form part of the GIS database that has been developed for this section. The results of the analysis are presented in the tables, appendices and drawings prepared for this section. These include:

- permanent population database and distribution;
- transient population database and distribution;
- special population groups database and distribution;
- cumulative population database and distribution;
- population projection database and distribution.

The consideration of district and regional planning is based on qualified interpretation of broad strategic plans, policy and strategic directives by suitably qualified and experienced professionals, approved by Eskom.

The following documents were compiled by the consultant and approved by Eskom to assist in quality assurance and to present a clear and auditable trail showing how key decisions were made and conclusions reached:

- SRK's Integrated Quality Management System and associated Work Instructions;
- the project-specific Project Quality Plan;
- Method Statement;
- Quality Control Plans;
- Project Process Chart.

The demography characterisation has followed a peer review process to ensure that the work is carried out using standard industry methodologies and approaches. The peer review was carried out by a suitably qualified, independent and experienced professional, approved by Eskom. Quality assurance is therefore demonstrated.

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Electronic records have been stored in a secure central repository with regular off-site backup procedures and subject to Eskom's approval. The overall quality system complies with ***Chapter 10*** (Management System). All references cited are saved on the central repository.

5.4.16 Conclusions

This section of this DSSR has presented the approach and results of the investigation and characterisation of the current and expected future demographic characteristics in the site vicinity and region and those demographic aspects that affect or have importance for the feasibility of the emergency planning over the projected life of the nuclear installation(s).

Current national normative acts and regulations, specifically relevant to a demographic investigation, have been applied. Where there are no national requirements, criteria or limits, international standards and best practice were considered.

Information on existing and projected population distributions in the region, including resident populations and to the extent possible transient populations, were collected, analysed and presented. Special attention was paid to the population living in the immediate vicinity of the nuclear installation(s), to densely populated areas and population centres, and to special population groups and residential institutions such as homes for the aged, schools and hospitals.

The results of the assessment have been presented in the form of figures, drawings and tables in the text above and also in ***Appendices 5.4.A*** to ***5.4.P***. The following main conclusions are drawn:

- The analysis of the 2011 census data showed that a permanent population of approximately 4 351 410 persons resided within 80 km of the Duynefontyn site in 2011.

- The largest population concentrations in 2011 are in an east-southeast, southeast, south-southeast (highest) and south direction from the nuclear installation(s), coinciding with urban settlements within the City of Cape Town.

- Approximately 112 610 persons resided within the 16 km radius around the nuclear installation(s) in 2011.

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- The population gender composition (2011) is relatively evenly distributed throughout the 16 km radius with females having a slightly higher count at approximately 57 670 females (51 per cent) against approximately 54 940 males (49 per cent).

- The majority of the permanent population (2011) within the 16 km radius (approximately 69 per cent) is under the age of 40 years and the highest proportion (approximately 19 per cent) per age group is between the ages of 20 and 29 years.

- Approximately 32 260 dwellings are found within 16 km of the nuclear installation(s) (2011). The majority of the dwellings (approximately 92 per cent) are of a formal nature (such as houses, townhouse and flats) and approximately 8 per cent of the dwellings are of an informal nature (such as in backyards and informal settlements).

- The 2011 census data for the 6.5 km radius indicate that the site conforms to the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) insofar as it relates to population density and centres. The site, however, does not conform to these guidelines in terms of their recommendations for the 16 km, 35 km and 50 km radii. Please note that the referenced documents act only as a guide and are not an NNR requirement.

- The 2001 and 2011 census data indicate that the Blaauwberg District, within which the nuclear installation(s) is located, experienced substantial population growth between 2001 and 2011 (i.e. 6 per cent). The Blaauwberg District had the highest population growth rate within the City of Cape Town during this period.

- Various factors influence population data and growth within a particular geographical region. Such factors include, *inter alia*, fertility rates, birth rates, infection rates of HIV/AIDS and tuberculosis, death rates, migration, government policies and spending (e.g. economic policies, spatial policies such as the identification of new development nodes). These factors fluctuate over time and cannot be reliably foreseen over long periods. Subsequently, the reliability of

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population projections and its distribution decreases over time.

- Population projections for the permanent population have been presented based on existing reputable growth rates that have been estimated for the area, spatial planning directives and known growth rates (e.g. comparing current census data with previous census data for the area, estimated growth rates as obtained from local authorities and allocation of population numbers to sectors envisaged for future growth and development).

- The permanent population distribution has been projected in five-year intervals up to 80 km from the nuclear installation(s) until 2096. The permanent population projections within the 80 km radius around the nuclear installation(s) indicate approximately:

  o 5 128 040 persons in 2018;

  o 6 134 620 persons in 2026;

  o 8 682 380 persons in 2046;

  o 21 594 510 persons by 2096.

    - The permanent population projections indicate that the site conforms to the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) insofar as it relates to population density and centres in respect of the 6.5 km radius in 2018 and 2026. However, based on current growth trends, the site may possibly not conform to these guidelines for the 6.5 km radius in 2046 and 2096 and the 16 km, 35 km and 50 km radii for 2018, 2026, 2046 and 2096. Please note that the referenced documents act only as a guide and are not an NNR requirement.

    - A number of measures have been incorporated within the City of Cape Town Municipal Spatial Development Framework (2023), the Blaauwberg District Spatial Development Framework (2023) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development

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Management Scheme (as amended 2019) to control development around the nuclear installation(s).

- The tourist population distribution has been projected in five-year intervals up to 80 km from the nuclear installation(s) until 2096. The total number of tourists within the 80 km radius around the Duynefontyn site on any one day in the peak month (i.e. December) has been estimated (upper estimate) to be approximately:
  - 191 750 tourists in 2018;
  - 228 040 tourists in 2026;
  - 322 150 tourists in 2046;
  - 805 600 tourists by 2096.
- The total cumulative population distribution has been projected in five-year intervals up to 80 km from the nuclear installation(s) until 2096. The estimated total cumulative population within the 80 km radius around the nuclear installation(s) indicate approximately:
  - 5 319 790 persons in 2018;
  - 6 362 660 persons in 2026;
  - 9 004 530 persons in 2046;
  - 22 400 120 persons by 2096.
    - The total cumulative population estimates indicate that the site conforms to the international guidance provided by the US NRC Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014) and the EPRI Site Selection and Evaluation Criteria for New Nuclear Power Generation Facilities (Electric Power Research Institute, 2015) insofar as it relates to total cumulative population density and centres in respect of the 6.5 km radius in 2018 and 2026. However, based on current growth trends, the site may possibly not conform to these guidelines for the 6.5 km radius in 2046 and 2096 and the 16 km, 35 km and 50 km radii for 2018, 2026, 2046 and 2096. Please note that the referenced documents

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act only as a guide and are not an NNR requirement.

- A number of measures have been incorporated within the City of Cape Town Municipal Spatial Development Framework (2023), the Blaauwberg District Spatial Development Framework (2023) and the City of Cape Town Municipal Planning By-Law, 2015 with its Development Management Scheme (as amended 2019) to control development around the nuclear installation(s).

- Informal settlements continue to spring up across the City of Cape Town as a result of rapid urbanisation and population growth. In an attempt to combat unlawful occupation of land, the City of Cape Town approved the Unlawful Occupation By-Law, 2021. This By-Law sets out procedures and obligations for both the City of Cape Town and private landowners with regard to land that is unlawfully occupied. It is the responsibility of all landowners to monitor unlawful occupation of land, as well as for actioning the necessary measures to remove unlawful occupants in a timeous manner.

- Projected populations within the PAZ and UPZ must be monitored and controlled to ensure change of land use within the site vicinity are evaluated for its potential impact on emergency planning. These requirements need to be retained within existing strategic planning directives, SDFs and by-laws and incorporated by local authorities within future strategic planning directives, SDFs and by-laws where applicable.

- Regarding the EP zones:

  o 0 km to 5 km EP zone (PAZ):

  - It was estimated that the PAZ had a permanent population (2018) of approximately 6 720 persons.

  - The estimated total cumulative population (2018) within the PAZ was approximately 7 010 persons.

  - A permanent population of approximately 8 830 persons has been projected for the PAZ by 2026.

  - A total cumulative population of approximately 9 200 persons has been projected for the PAZ by 2026.

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- A permanent population of approximately 12 970 persons has been projected for the PAZ by 2046.
- A total cumulative population of approximately 13 520 persons has been projected for the PAZ by 2046.
- A permanent population of approximately 34 900 persons has been projected for the PAZ by 2096.
- A total cumulative population of approximately 36 380 persons has been projected for the PAZ by 2096.
- Of the approximately 3 610 persons residing in the PAZ in 2011, 1 850 persons (51 per cent) are female and 1 757 persons (49 per cent) are male.

o 5 km to 16 km EP zone (UPZ):

- It was estimated that the UPZ had a permanent population (2018) of approximately 136 660 persons.
- The estimated total cumulative population (2018) within the UPZ was approximately 142 470 persons.
- A permanent population of approximately 175 650 persons has been projected for the UPZ by 2026.
- A total cumulative population of approximately 183 120 persons has been projected for the UPZ by 2026.
- A permanent population of approximately 272 740 persons has been projected for the UPZ by 2046.
- A total cumulative population of approximately 284 330 persons has been projected for the UPZ by 2046.
- A permanent population of approximately 742 850 persons has been projected for the UPZ by 2096.
- A total cumulative population of approximately 774 440 persons has been projected for the UPZ by 2096.
- Of the approximately 109 000 persons residing in the UPZ in 2011, 55 820 persons (51 per cent) are female and

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53 180 persons (49 per cent) are male.

- 16 km to 80 km EP zone (LPZ):
  - It was estimated that the LPZ had a permanent population (2018) of approximately 4 984 660 persons.
  - The estimated total cumulative population (2018) within the LPZ was approximately 5 170 310 persons.
  - A permanent population of approximately 5 950 140 persons has been projected for the LPZ by 2026.
  - A total cumulative population of approximately 6 170 340 persons has been projected for the LPZ by 2026.
  - A permanent population of approximately 8 396 670 persons has been projected for the LPZ by 2046.
  - A total cumulative population of approximately 8 706 680 persons has been projected for the LPZ by 2046.
  - A permanent population of approximately 20 816 760 persons has been projected for the LPZ by 2096.
  - A total cumulative population of approximately 21 589 300 persons has been projected for the LPZ by 2096.

- A number of uncertainties have been identified, including issues relating to the following:
  - population projections;
  - tourist data and projections;
  - transient nodes and recreational destinations;
  - projected special population groups;
  - spatial planning;
- Proposed monitoring measures to reduce the above mentioned

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uncertainties include the following:

o Pre-operational:

- Population Projections: It is essential to update or confirm population distribution data and projected population figures on a regular basis, e.g. shortly after the completion of national censuses.

- Tourist Data and Projections: Tourist population numbers and projections should periodically be reviewed and updated throughout the nuclear installation lifetime. This should be carried out at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- Transient Nodes and Recreational Destinations: The number, location and capacity of existing and future transient nodes and recreational destinations and venues should be periodically reviewed and updated. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- Special Population Groups: The number and location of existing and future special population groups should periodically be reviewed and updated. This should be carried out at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- Spatial Planning: It is essential to ensure that the requirements and needs of the nuclear installation(s) are considered and accounted for by local authorities in strategic planning directives, SDFs and applicable by-laws when these are periodically updated or amended.

- Projected populations within the PAZ and UPZ must be monitored and controlled to ensure change of land use within the site vicinity is evaluated for its potential impact on emergency planning.

o Operational:

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- Population Projections: It is essential to update or confirm population distribution estimates and projected population data throughout the nuclear installation lifetime on a regular basis, e.g. shortly after the completion of national censuses.

- Tourist Data and Projections: Tourist population numbers and projections should periodically be reviewed and updated throughout the nuclear installation lifetime. This should be carried out at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- Transient Nodes and Recreational Destinations: The number, location and capacity of existing and future transient nodes and recreational destinations and venues should be periodically reviewed and updated throughout the nuclear installation lifetime. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- Special Population Groups: The development of existing and future special population groups in terms of their number and location should periodically be reviewed and updated throughout the nuclear installation lifetime. This should be performed at the time of review and update of the permanent population distribution data and projected population data, e.g. shortly after the completion of national censuses.

- Spatial Planning: It is essential to ensure that the requirements and needs of the nuclear installation(s) are considered and taken into account by local authorities in strategic planning directives, SDFs and applicable by-laws when these are periodically updated or amended.

- Projected populations within the PAZ and UPZ must be monitored and controlled to ensure change of land use within the site vicinity are evaluated for its potential impact on emergency planning.

o Post Operational:

As for the operational stage of the nuclear installation(s), the

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same demographic data should be monitored in the vicinity of the site (e.g. 16 km). The scope and focus of the monitoring will depend on the level of contamination of the site and the end state of decommissioning, e.g. restricted use (e.g. temporary storage of waste) or unrestricted release from regulatory control (e.g. use for farming or residential area). These and other considerations should be taken into account in strategic planning directives, SDFs and applicable by-laws.

In conclusion, the following can be confirmed:

- The population characteristics in the site region and site vicinity have been determined.
- The current and future population distribution and densities in the site region and site vicinity have been determined.
- Studies have been conducted to an adequate level of detail for the purpose of PRIPE (***Chapter 7***) and EP (***Chapter 8***).
- The demography information presented in this section may also be utilised in the Probabilistic Safety Assessment (PSA) Level 3.
- Appropriate monitoring programmes to provide ongoing assurance regarding the viability of the site over its lifecycle can be established.
- This section of this DSSR complies with relevant regulatory requirements.

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