CROCODILE EAST WATER PROJECT (CEWP)
MODULE 1: TECHNICAL FEASIBILITY STUDY

Project Steering Committee Meeting No. 1

Directorate: Water Resource Development Planning (East)

Date: 4 August 2023

WATER IS LIFE - SANITATION IS DIGNITY

water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

2030 NDP

AGENDA

09:00	**1**	**Welcome and Introduction**	Chairperson
09:10	**2**	**Attendance and Apologies**	Chairperson
09:20	**3**	**Acceptance of Agenda**	All
09:25	**4**	**Purpose of Meeting**	Chairperson
9:35	**5**	**DWS Planning to Implementation Methodology** (20 Minutes)	Mr Kobus Bester / (PSP)
		Questions/Discussions	
10:10	**6**	**Overview of Study** (40 Minutes) • Motivation for the CEWP • Study Area • Scope of the Study • Study Approach • Methodology, Tasks and Deliverables • Public Relations • Study Programme	Mr Kobus Bester / (PSP)
		Questions/Discussions	
11:05	**7**	**Comfort Break** (15 Minutes)	
11:20	**8**	**Progress of Study** (15 Minutes)	Mr Kobus Bester / (PSP)
11:35	**9**	**Pre-Feasibility Study: Environmental Screening** (30 Minutes)	Ms Tolmay Hopkins
		Questions/Discussions	
12:20	**10**	**Establishment of the PSC for the CEWP**	Chairperson
12:50	**11**	**Additions** 11.1 11.2	All
13:00	**12**	**Way Forward / Key Decisions**	Mr Kobus Bester
13:12	**13**	**Date of Next Meeting**	All
13:20	**14**	**Closure**	Chairperson
13:30	**15**	**Lunch**	All

4. PURPOSE OF MEETING

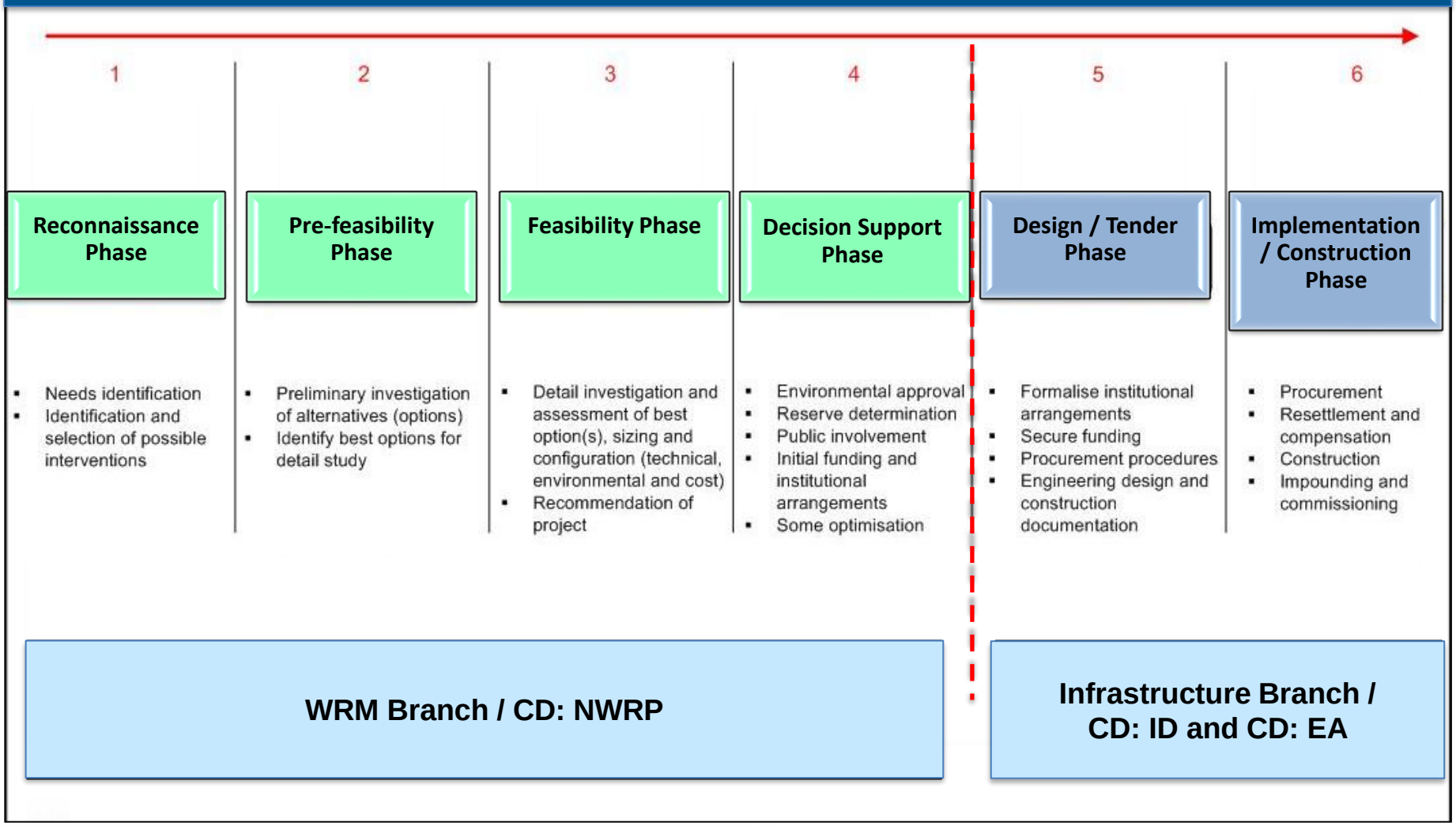
PURPOSE OF MEETING

- Present the DWS Planning to Implementation Methodology;
- Introduce Study to Stakeholders;
- Provide an overview of the CEWP Study;
- Present progress on the Study to date;
- Establish a Project Steering Committee (PSC) for the CEWP.

5. DWS METHODOLOGY:

PLANNING TO IMPLEMENTATION

Planning to Implementation Phases for New Infrastructure



Areas Identified for Fast Tracking the Planning Process (1)

Planning Phase	Description of Critical Planning Action	Minimum Timeframe (years)
Reconnaissance	Development, review and updating of reconciliation strategies for key large systems and schemes for all towns and clusters of villages throughout the country.	1
Pre-Feasibility	Preliminary investigations are done to compare various options and select the preferred solution. Most of the time is taken up by screening of aspects such as social and environmental fatal flaws, hydrological analyses to ascertain the additional water that will be made available by various options etc.	2

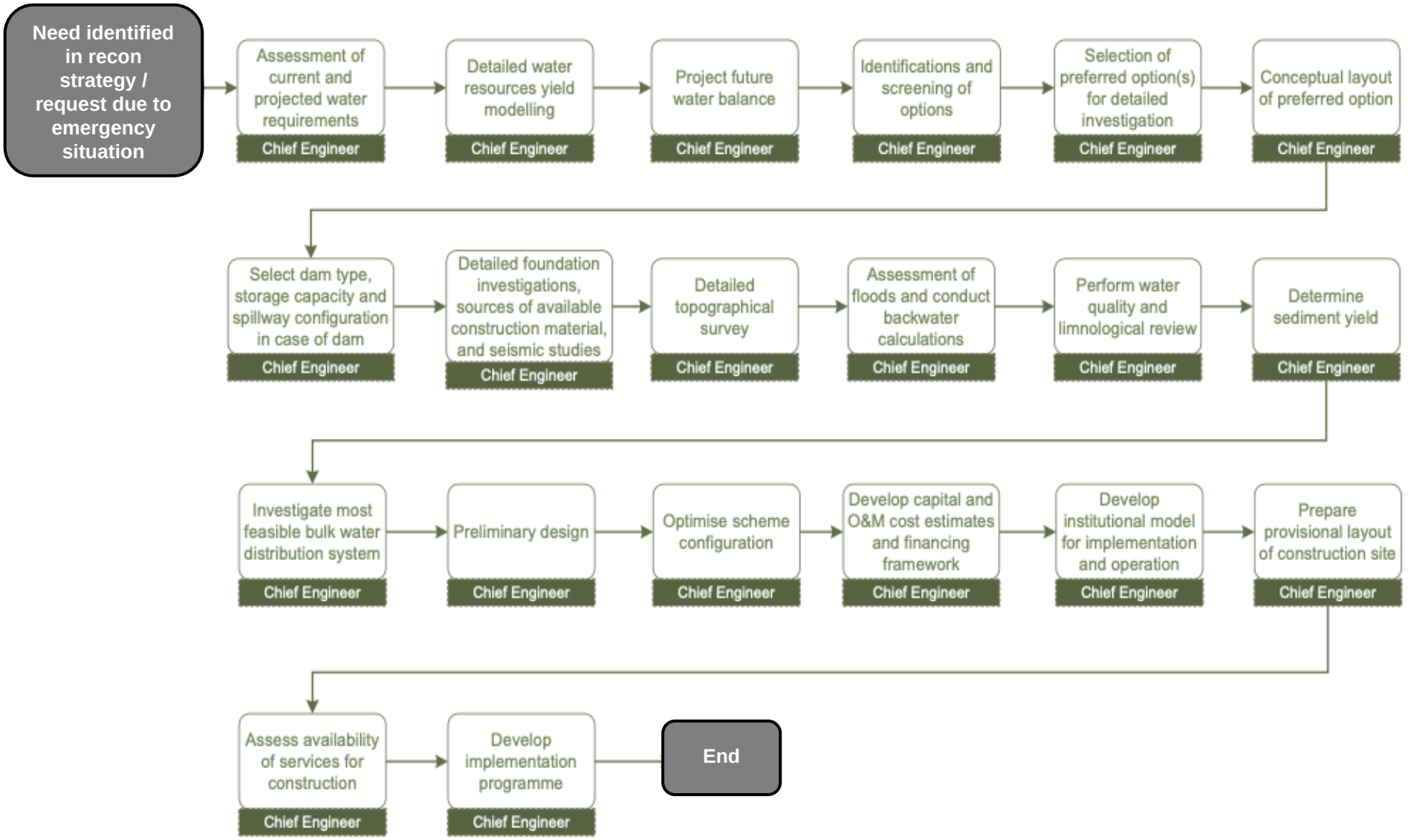
Areas Identified for Fast Tracking the Planning Process (2)

Planning Phase	Description of Critical Planning Action	Minimum Timeframe (years)
Feasibility	Optimization, preliminary design, costing and socio-economic impact analysis of the project. Detailed geotechnical and materials investigation. Environmental Impact Assessment.	**2**

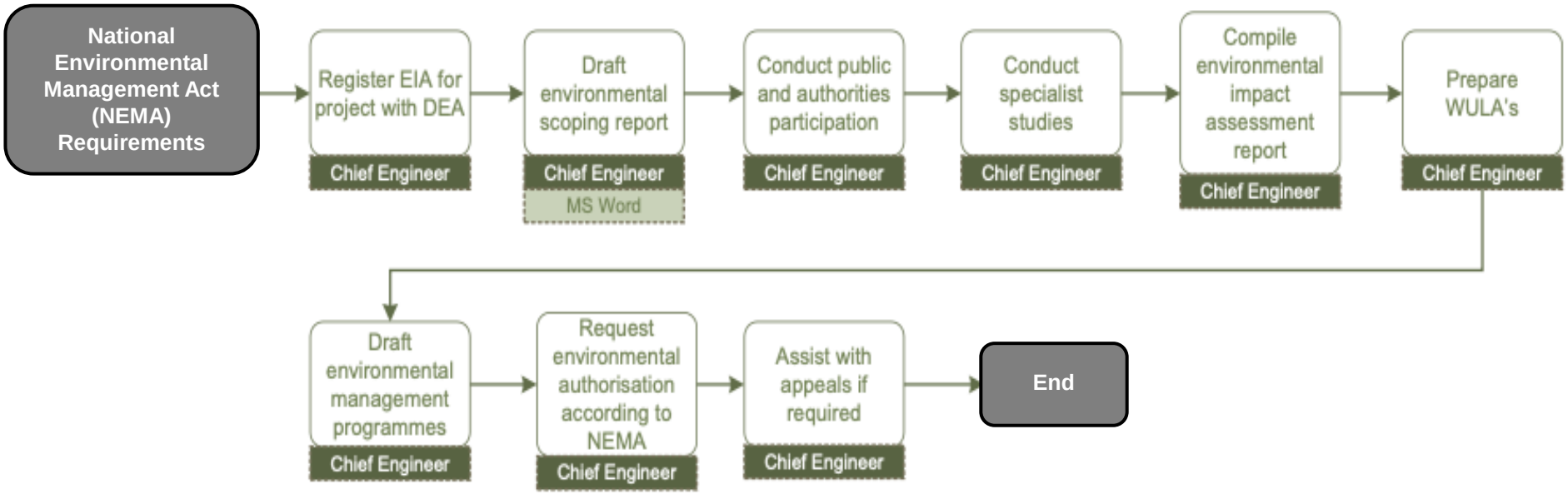
Areas Identified for Fast Tracking the Planning Process (3)

Planning Phase	Description of Critical Planning Action	Minimum Timeframe (years)
Decision Support	Authorizations and approvals by the relevant authorities. Legal, Funding and Institutional Arrangements. Record of Implementation Decisions (RID).	2

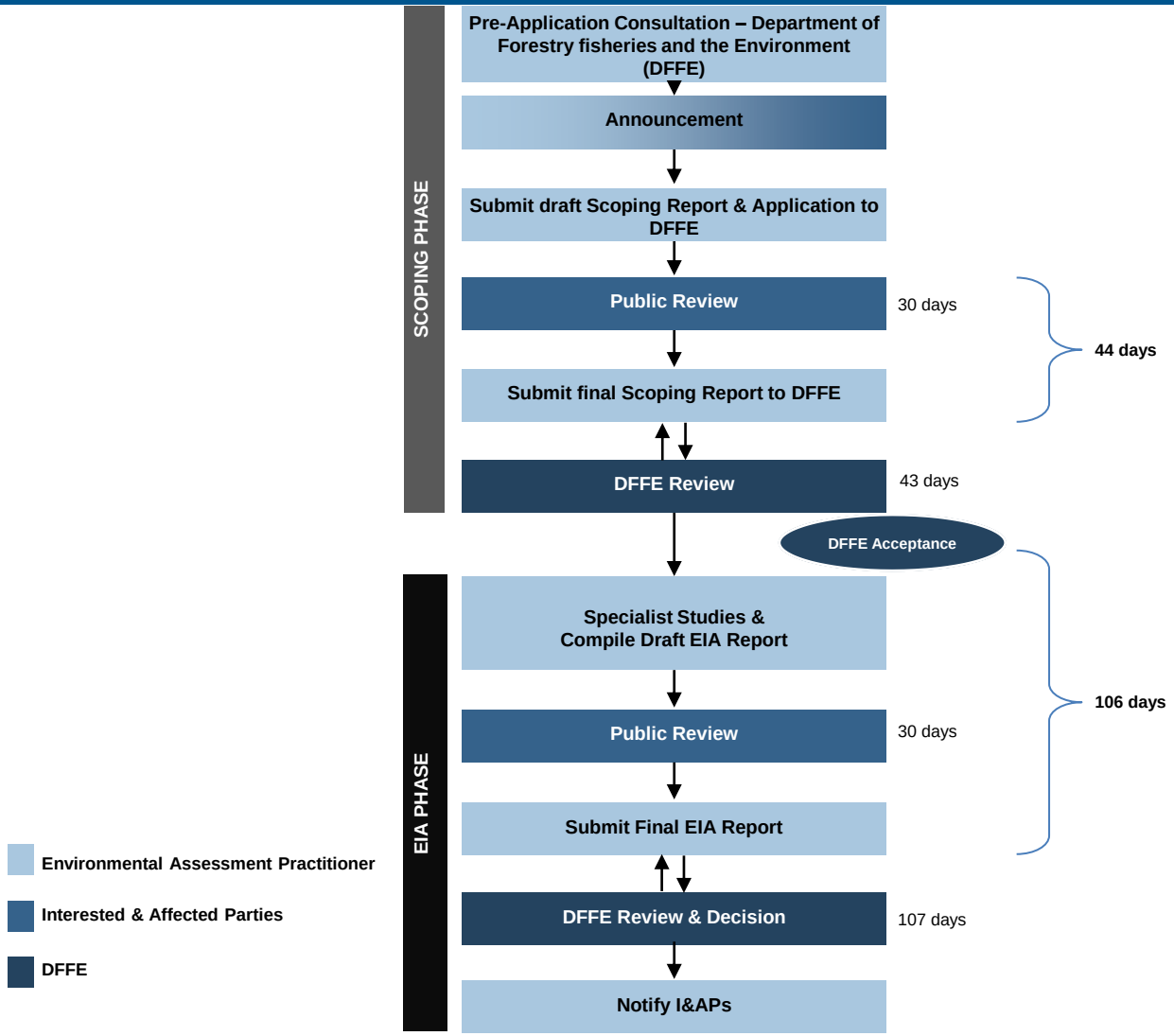
TECHNICAL FEASIBILITY INVESTIGATION



ENVIRONMENTAL IMPACT ASSESSMENT

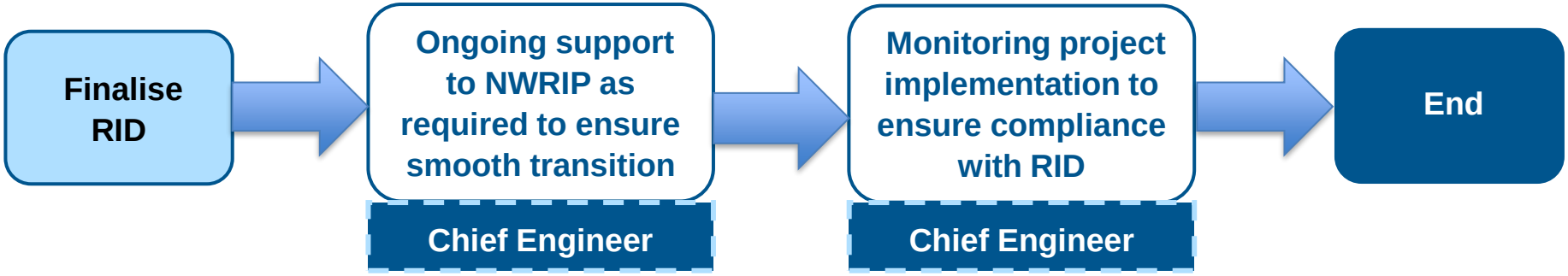


UNDERTAKING AN ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AS PER THE LEGISLATIVE PROCESS



- This process lags in time behind a Technical Feasibility study
- The process follows the EIA Regulations amended in 2017.
- In order to ensure a comprehensive assessment is done and considering that time period between the prescribed actions is too short to conduct specialist studies as some require seasonal information, once all screening and specialist studies are completed, D:WRDP initiates a pre-application consultation with DFFE to kickstart the legislative process.

IMPLEMENTATION SUPPORT



Questions/Discussions

6. OVERVIEW OF STUDY

6.1 Motivation for Study (1 of 3)

- Water of the Crocodile River System in Mpumalanga – **fully allocated**
- Water requirements – **continuous growth**

Deficit

- Regular water shortages (domestic, commercial and agricultural sectors)
- Unable to meet environmental requirements
- Pressure from Mozambique to meet minimum cross-border flows

Solution

Proposed Intervention: **A New Dam in the Crocodile River Catchment**

6.1 Motivation for Study (2 of 3)

The following previous studies and investigations related to the Study were completed.

- Interim IncoMaputo Agreement (IIMA), Tripartite Technical Committee (TPTC) Mozambique, South Africa & Swaziland – August 2002.
- Inkomati Water Management Area Internal Strategic Perspective (ISP) PWMA 05/000/00/0303 – March 2004.
- Crocodile (East) River Development, Reconnaissance Study, PD Naidoo & Associates – September 2008.
- Inkomati Water Availability Assessment Study, Main Report (IWAAS) PWMA 05/X22/00/0808 – June 2009.
- Progressive Realisation of the IncoMaputo Agreement (PRIMA): Basin Management Alternatives and Feasibility Report: Part B: Inkomati River Basin, Report No: Implementation Activities and Action Plan (IAAP) 3 – April 2011.
- Inkomati Water Management Area: Modelling Support for Licensing Scenarios: Identification of Dam Sites on Crocodile River (East) – 1st Draft 2011.
- Comprehensive Reserve Determination Study for Selected Water Resources (Rivers, Groundwater and Wetlands) in the Inkomati Water Management Area, Mpumalanga.
- Development of Real-Time Operating Rules for the Crocodile River Catchment.
- Water Requirements and Availability Reconciliation Strategy for the Mbombela Local Municipality – February 2014.
- Continuation of Water Requirements and Availability Reconciliation Strategy for the Mbombela Municipal Area – October 2020.

6.1 Motivation for Study (3 of 3)

Based on previous studies and investigations, the following **four proposed dams** within the Crocodile (East) River Catchment were recommended for further study as part of the **Crocodile East Water Project: Module 1: Technical Feasibility Study:**

- Mountain View Dam on the Kaap River
- Montrose Dam on the Crocodile East River
- Boschjeskop Dam on the Nels River
- Strathmore Off-Channel Storage Dam, near the confluence of the Kaap and Crocodile Rivers

6.2 Study Area (1 of 3)

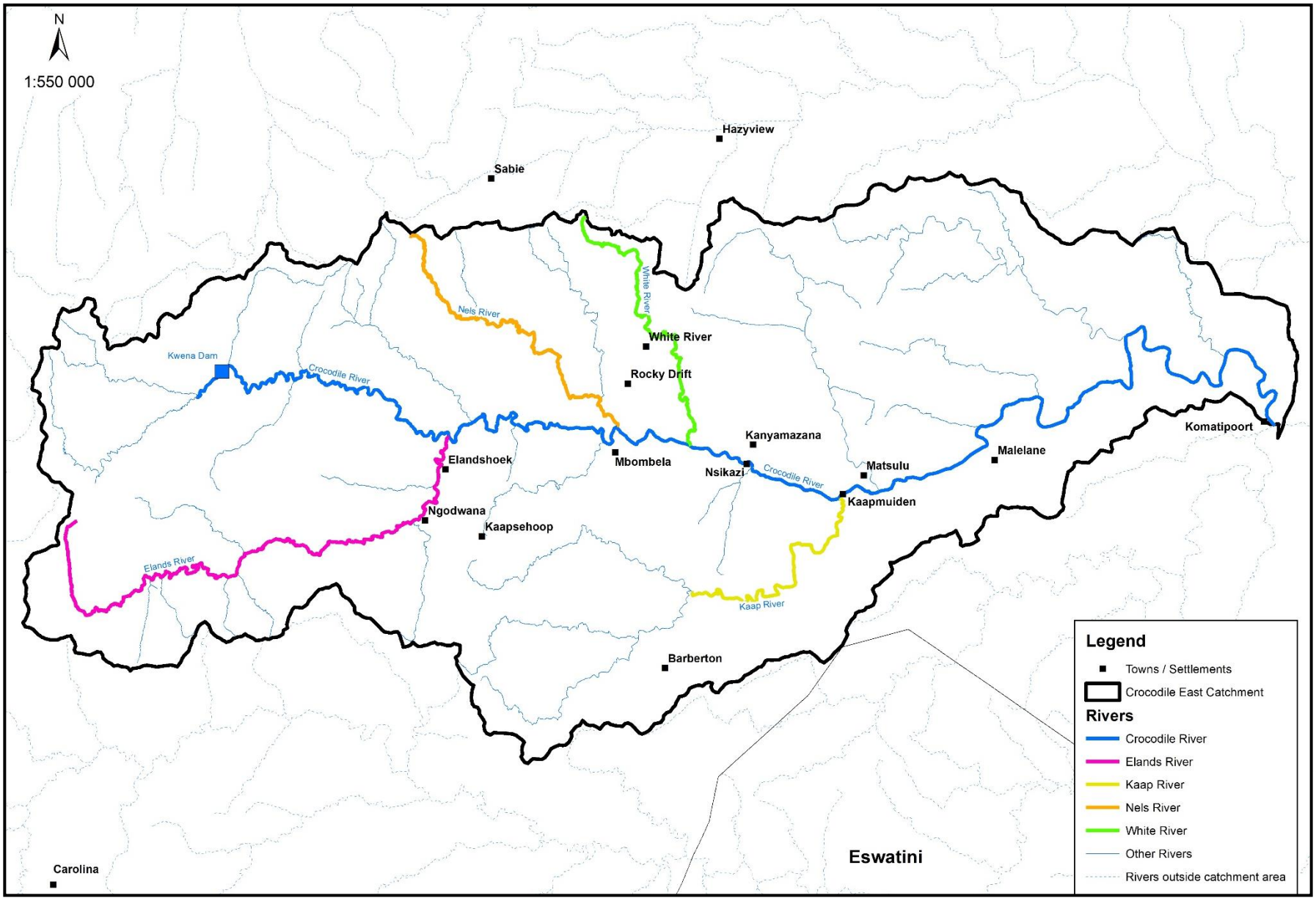
Crocodile (East) River Catchment

- Situated in the north-east of South Africa.
- Part of larger Inkomati River Basin (Basin is shared between Mozambique, South Africa and Eswatini).
- Water of the Inkomati River Basin is shared between Mozambique, South Africa and Eswatini.
- Only major dam in the catchment is the Kwena Dam in the Upper Crocodile River Catchment.

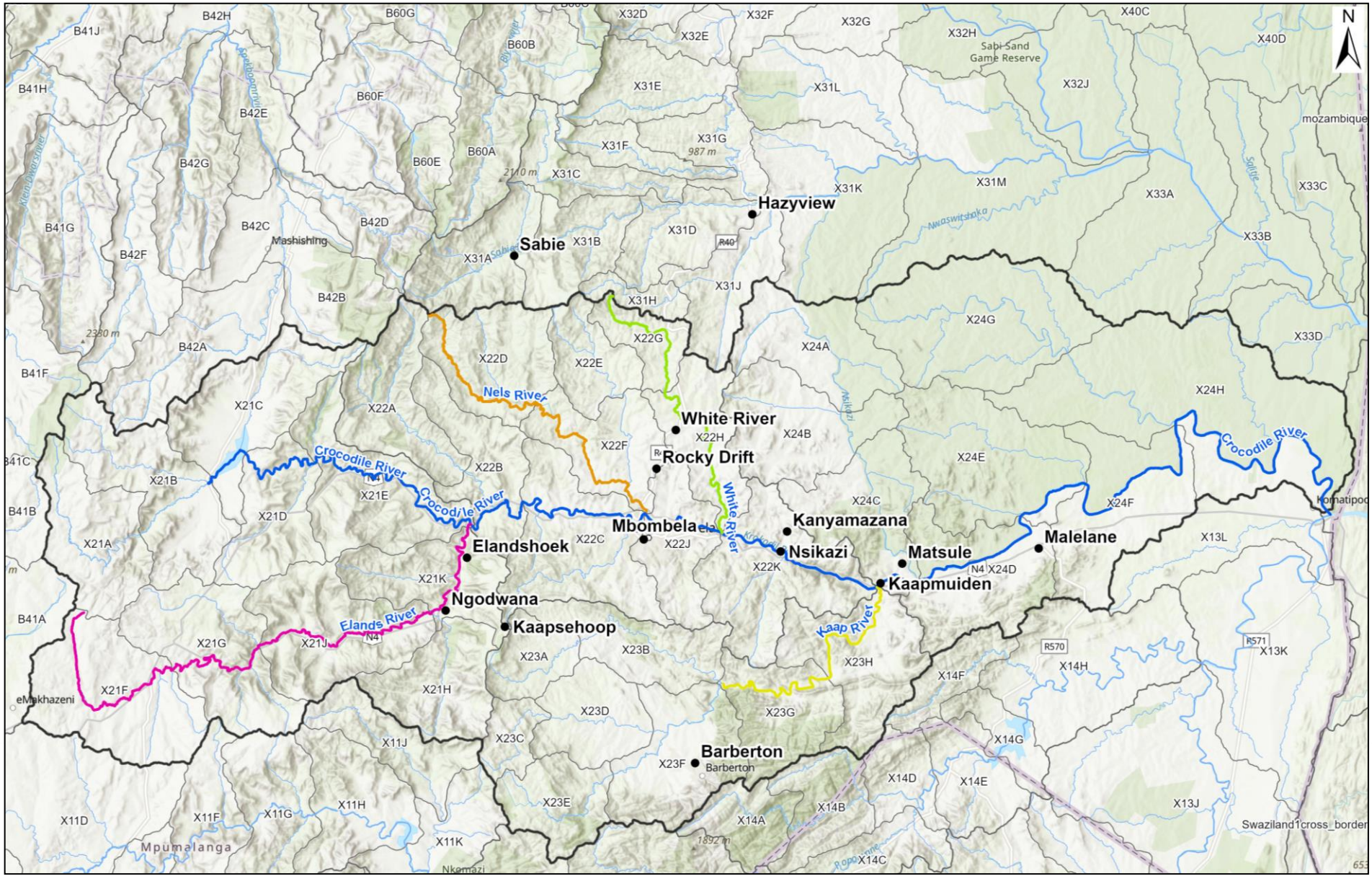
The Crocodile (East) River Catchment comprises of four tertiary catchments:
Upper Crocodile Catchment (X21)
Middle Crocodile Catchment (X22)
Lower Crocodile Catchment (X24)
Kaap Catchment (X23)

Important tributaries of the Crocodile River include the following:
Kaap River
Elands River
Nels River
White River

6.3 Study Area (2 of 3)



6.3 Study Area (3 of 3)



6.3 Scope of Study

Objective of Feasibility Study: undertake and finalise the planning of a raw water supply scheme comprising a dam(s) and related conveyance infrastructure in the Crocodile (East) River Catchment.

The proposed scheme configuration from a strategic water resource perspective, needs to provide a **long-term regional water supply solution** for the Crocodile (East) River Catchment.

In order to expedite the planning for a dam(s) in the Crocodile River Catchment, the Feasibility Study has been divided in **two** separate interactive and **concurrently** running modules, as follows:

Module 1: **Technical Feasibility Study**	**Module 2:** **Environmental Impact Assessment**
iX engineers (Pty) Ltd was appointed for the Crocodile East Water Project: Module 1: Technical Feasibility Study.	Nemai Consulting CC was appointed to undertake Module 2, which will commence during the Phase 2 of the Module 1 Study.

6.4 Study Approach (1 of 6)

The Module 1: Technical Feasibility Study will be undertaken in two separate phases, as follows:

Phase 1: Pre-Feasibility Study
Four Dam Options

Pre-Feasibility Study: To investigate **four** proposed dam options within the Crocodile (East) River Catchment and to recommend **one dam** option to be investigated in Phase 2.

Phase 2: Feasibility Study
One Dam Option

Feasibility Study: To investigate **one** possible dam option which was recommended for further study and development to a feasibility level of detail.

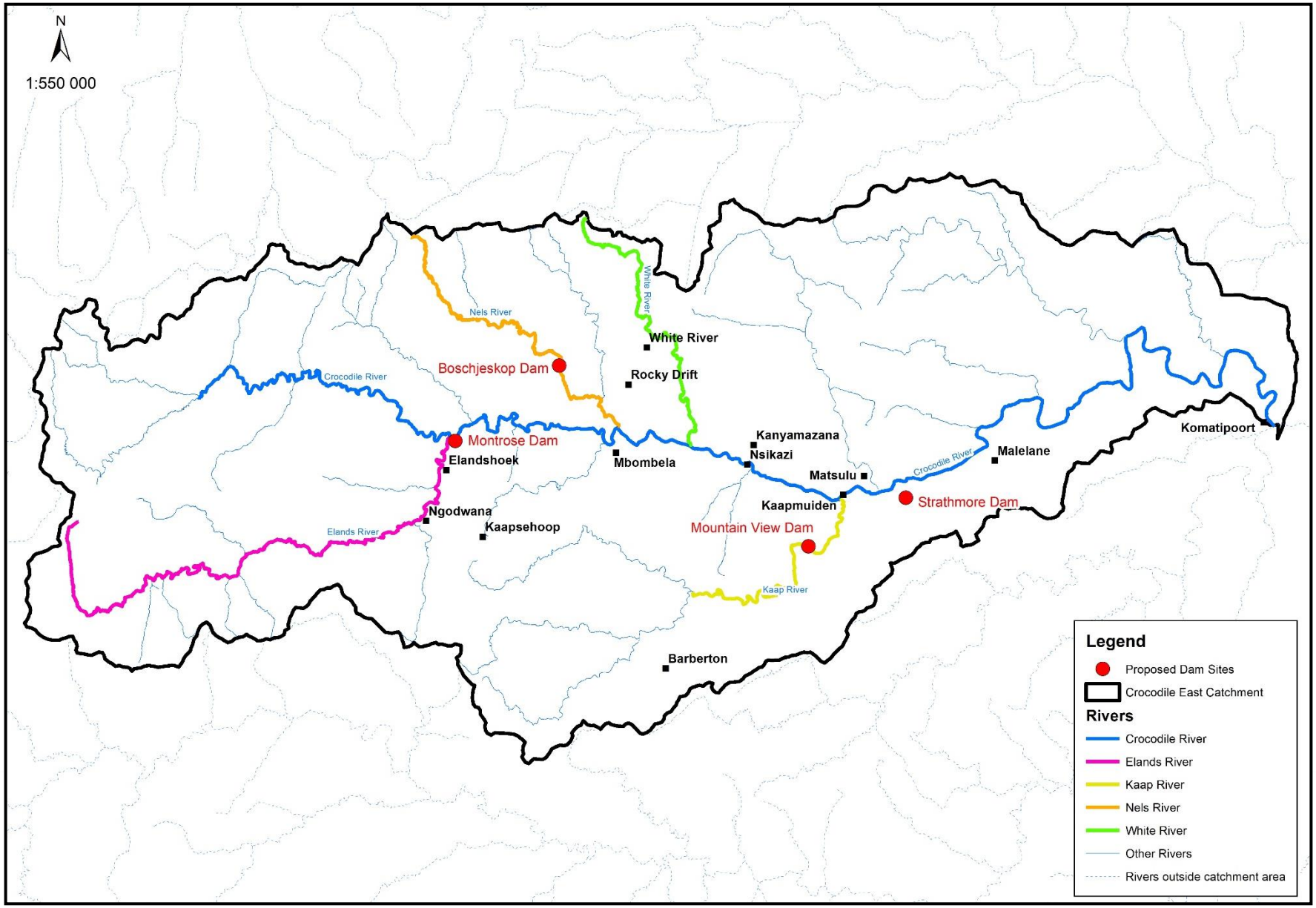
6.4 Study Approach (2 of 6)

Phase 1: Pre-Feasibility Study

The Pre-Feasibility Study will be undertaken for the following **four** dam options:

- Mountain View Dam on the Kaap River
- Montrose Dam on the Crocodile East River
- Boschjeskop Dam on the Nels River
- Strathmore Off-Channel Storage Dam, near the confluence of the Kaap and Crocodile Rivers

6.4 Study Approach (3 of 6)



6.4 Study Approach (4 of 6)

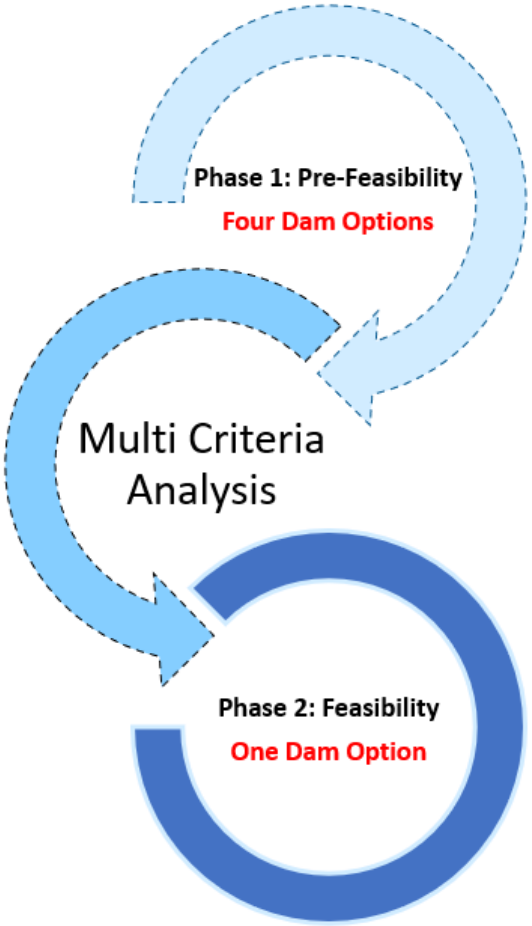
Phase 1: Pre-Feasibility Study

Due to the significant water deficits in the Crocodile (East) River Catchment it is possible that the implementation of more than one dam will be required.

A ranking/scoring system (**multi-criteria decision matrix**) rather than an elimination process will be adopted during the execution of the Pre-Feasibility Study.

Multi-criteria decision matrix (ranking system) will be applied to all four dams to enable a uniform comparison.

The highest ranking/scoring dam option will be selected and recommended for further investigation and development at feasibility level.



6.4 Study Approach (5 of 6)

Phase 1: Pre-Feasibility Study

Multi-Criteria Decision Matrix (ranking system) typically includes the following:

- Environmental impacts
- Yield analysis (Water Resources)
- Geological and geotechnical considerations
- Engineering (dam type, conveyance infrastructure, etc.)
- Capital expenditure (CAPEX)
- Operational expenditure (OPEX)
- Engineering economic analysis (Unit Reference Values)

For each of the above-mentioned criteria an appropriate ranking/scoring system (0 = worst, 5 = best) will be developed.

6.4 Study Approach (6 of 6)

Phase 2: Feasibility Study

Investigate **one** possible dam option which was recommended in the Phase 1: Pre-Feasibility Study for further study and development to a **feasibility level** of detail in the **Phase 2: Feasibility Study**.

Work will be done at a level of detail that will allow the proposed scheme to be ready for implementation in the shortest possible time upon the completion and conclusion of this Study.

6.5 Study Methodology, Tasks and Deliverables

The proposed Scope of work has been structured and broken down into various tasks and subtasks.

Phase 1: Pre-Feasibility Study (Four Dam Options)		
	Task	Deliverable
1	Study Inception	Inception meeting Site visits to the four dam options Inception Report
2	Ecological Consequences in Terms of the National Water Resource Class, the Target Ecological Category and the Reserve	Downstream Ecological Consequences and Potential Impacts on the National Water Resource Class Report
3	Perform/Review Historic Yield Analysis	Yield Analysis Report
4	Environmental Screening and Identification of Fatal Flaws	Environmental Screening Report
5	Perform/Review Geotechnical and Material Investigations	Geotechnical and Material Investigations Report
6	Engineering Investigation	Engineering Investigation Report
7	Topographical Survey and Mapping	Lidar DTM data, Contour and Orthophoto generation, Topographical detail mapping
8	Proposed Scheme Configurations (Engineering Investigation)	Proposed Scheme Configurations Report
9	Engineering Economic Analysis	Engineering Economic Analysis Report
10	Multi-Criteria Analysis	Multi-Criteria Analysis of Dam Options Report
11	Pre-Feasibility Study Report	Pre-Feasibility Study Report which includes information on the findings of the reports mentioned above.

Phase 2: Feasibility Study (Recommended/Selected Dam Option)

	Task	Deliverable
1	Environmental Screening	Environmental Screening Report
2	Water Resources, including: • Determine Existing and Future Water Demands • Yield Analysis with the Water Resource Yield Model • Future Water Balance for the Project • Development of Short-term Stochastic Yield Reliability Curves • Water Resources Planning Model (WRPM) • Assessment of the Potential for Hydropower Generation at the Dam (Water Resources)	Water Resources Report
3	Ecological Consequences in Terms of the National Water Resource Class, the Target Ecological Category and the Reserve	Ecological Consequences of Dam Operational Scenarios Report
4	Socio-Economic Impacts	Socio-Economic Impacts Report
5	Engineering Investigation, including: • Topographical Surveys and Mapping • Geological and Geotechnical Investigation • Geomorphological and Seismic Investigation • Flood Studies • Feasibility Design of the Selected Scheme • Construction Programming and Costing • Access and Advanced Infrastructure • Flood and Backwater Calculations for the Dam • Climatological Data for the Construction Site • Water Quality and Limnology • Sediment Yield and Sedimentation Investigation • Land Requirements and Associated Costs • Assessment of the Potential for Hydropower Generation at the Dams (Engineering Investigation) • Costing (CAPEX and OPEX) of the Project • Engineering Economic Analysis	Engineering Investigation Report

Phase 2: Feasibility Study (Recommended/Selected Dam Option)

	Task	Deliverable
6	Implementation Actions	Project Implementation Programme
7	Record of Implementation Decisions	Record of Decisions
8	Institutional, Financial and Operational Aspects	Institutional, Financial and Operational Aspects Report
9	Feasibility Study Report	Feasibility Study Report which includes information on the findings of the reports mentioned above.

6.6 Public Relations / Study Management

Public Relations Meetings

A full stakeholder engagement and public relations process, where relevant representative stakeholders in the Study will provide inputs into the Study, will be carried out to support the Study.

Two or three such meetings is foreseen.

Project Management Committee Meetings (PMC)

Purpose of PMC meeting is to report on, discuss and capture all activities that have happened on the project for the reporting period preceding each respective PMC meeting and to ensure understanding and buy-in of all members.

Project Steering Committee Meetings (PSC)

The Project Steering Committee's (PSC) main function is to assist the DWS with strategic matters and to coordinate the contributions of other authorities.

6.7 Study Programme

	Start Date	End Date	Duration
Technical Feasibility Study	**6 September 2022**	**30 September 2025**	**36 Months**
▪ Phase 1: Pre-Feasibility Study	6 September 2022	September 2023	12 Months
▪ Phase 2: Feasibility Study	October 2023	30 September 2025	24 Months

Commencement of Study: 6 September 2022

(Date of Signed Service Level of Agreement)

Questions/Discussions

7. Comfort Break

8. PROGRESS OF STUDY

8.1 Progress of Study

Phase 1: Pre-Feasibility Study (Four Dam Options)			
	Task	Deliverable	Status
1	Study Inception	Inception meeting Site visits to the four dam options Inception Report Site Visit Report	**Completed**
2	Ecological Consequences in Terms of the National Water Resource Class, the Target Ecological Category and the Reserve	Downstream Ecological Consequences and Potential Impacts on the National Water Resource Class Report	**Completed**
3	Perform/Review Historic Yield Analysis	Yield Analysis Report	**Completed**
4	Environmental Screening and Identification of Fatal Flaws	Environmental Screening Report	**Completed**
5	Perform/Review Geotechnical and Material Investigations	Geotechnical and Material Investigations Report	**Draft Report**
6	Engineering Investigation	Engineering Investigation Report	**Draft Report**
7	Topographical Survey and Mapping	Lidar DTM data, Contour and Orthophoto generation, Topographical detail mapping	**Completed**
8	Proposed Scheme Configurations (Engineering Investigation)	Proposed Scheme Configurations Report	**Draft Report**
9	Engineering Economic Analysis	Engineering Economic Analysis Report	**Calculations Completed**
10	Multi-Criteria Analysis	Multi-Criteria Analysis of Dam Options Report	**In Process**
11	Pre-Feasibility Study Report	Pre-Feasibility Study Report which includes information on the findings of the reports mentioned above.	**In Process**

9. Pre-Feasibility Study: Environmental Screening

Questions/Discussions

10. Establishment of PSC for CEWP

10.1 Project Steering Committee

The Project Steering Committee's (PSC) main function is to assist the DWS with strategic matters and to coordinate the contributions of other authorities.

A Project Steering Committee (PSC) needs to be established to facilitate communication and sharing of information at a higher level.

Key role players from the district and local municipalities and representatives from relevant irrigation boards, Water Services Authorities, the IUCMA, national, provincial and regional government were invited to PSC Meeting No. 1.

11. Additions to Agenda

12. Way Forward / Key Decisions

13. Date of Next Meeting

14. Closure

Thank You