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Upgrading the Eastern Cape's Provincial Roads from Gravel to Surface Roads.

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Executive Summary

Some key elements:-

- Inhouse construction has an allocation of 54km roads upgrades (7 projects to the value of R259million) as to the 95.7km to outsourced (9 projects to the value of R403million)
- The department outsources many of the professional services. The utilisation of inhouse design and contract management capability should be further analysed for effectiveness and efficiencies. This utilisation should also be aligned to what construction works are being implemented in-house and outsourced.
- The department uses its personnel and plant to upgrade the projects. However, departmental resources are in short supply compared to the number and nature of projects that it upgrades. The department's in-house construction will on a continuous basis outsource services to augment the shortfalls of the departmental resources (construction plant & construction personnel).

Road projects are always unique – benchmarking, or getting an “average” is fraught with potential distortions i.e.:

- It is a highly technical process, and is only as good as the historical data available,
- One can easily come to incorrect conclusions,
- Requires engineering experience & judgement to determine what is relevant or not,
- Use of a simplistic two-variable metric (R/ km) can be mis-leading,
- It requires complex algorithms per cost criteria/drivers,
- The number of variables can overpower the result,
- Historical values must be regularly corrected for inflation to permit ongoing realistic comparisons.

The information provided by the department does allow for a high-level cost assessment to determine whether it is more efficient to implement these types of projects in-house or outsourced. It is best suited to have a more intensive assessment of each of the roads assessed with more review of all the cost drivers described above.

Inhouse Construction

- Average cost / km is R18.2 million / km which is higher than the TMH 22 CRC replacement guideline of R13.6 million / km
- This average cost could be seen as being conservative as the estimates for Inhouse persal and plant costs were using best case scenarios to benefit the department.
- Although the department submitted 7 projects – only 3 were deemed suitable for this analysis. All 3 roads used in the calculation have been in construction from 2016/17 (or before) – which raises efficiency questions (5 years plus); namely: -
 - Should roads with structures (e.g., bridges, large culverts and retaining walls etc.) be constructed in-house
 - Has the department got the right competency and resources to implement in reasonable timeframes?

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- Even though they are done “in-house” most of the work is completed by outsourced service providers – which cancels the reasoning of “time saving due to procurement extended time frames”.

Outsourced Construction

- The scope of work on outsourced projects is of bigger magnitude compared to the ones executed in-house i.e. the inclusion of other road facility amenities like bridges
- Number of kilometres completed in a financial year is more
- Average cost / km is R13.2 million / km which is in line with the TMH 22 CRC replacement guideline of R13.6 million / km
- Although the department submitted 9 projects – only 4 were deemed suitable for this analysis. All 4 roads used in the calculation have been in construction for plus minus 2 years – including structures (e.g. bridges, large culverts and retaining walls etc.) which is in stark contrast to those done in-house

Key recommendations are: -

- i. In-house construction takes longer and is more expensive – thus they should focus on smaller gravel upgrade projects with no structures involved.
- ii. Even though it is deemed to be In-house construction – many of the components if the project need procurement and are thus also outsourced. The department should review its resources to ensure effectiveness of deploying its own resources to ensure that public resources are maximised
- iii. In-house plant needs a detailed analysis to ensure its utilisation is efficient and not wasted – this should be one of the determining factors on which roads are allocated for in-house construction.
- iv. The in-house construction section needs to be resourced to meet the demand to attain the efficiency desired.
- v. Outsourced need also to be closely monitored as there are wastages observed, with the need for relevant personnel resourcing as the unit underperformed on the last financial year end (20/21).
- vi. There should be a review of a model utilizing a combination of the two models to complement each other and limit the risk.

The main conclusion from this study is that the department will clearly benefit from having a better understanding of unit costs and related issues to in-house versus outsourced construction, a more permanent road unit cost database should be established, which can then be analyzed on a systematic basis.

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Summary

The protracted duration of implementation of gravel roads upgrades to surfaced roads within the EC Province remains a challenge. This becomes the root cause of perpetual inflation of time, and funding spent on maintenance of provincial roads, which are largely gravel roads and are susceptible to dilapidate earlier than their design period and life span expected, taking into cognisance the stupendous volume of traffic on gravel roads networks, within the province and cost pressure exerted on maintenance of the gravel roads.

This report seeks to evaluate the value created in the implementation of the upgrading of gravel roads to surfaced roads in the Eastern Cape Province. The Department of Transport (DoT) in the Eastern Cape implements the upgrading of gravel roads to surface standard either by implementing outsourced construction or in-house construction.

The latest released data on the current Road Asset Management Plan (RAMP) 21/22 financial year, there are more than 3 million vehicle-kilometres travelling on the paved road network per day in the Eastern Cape (EC) province. Whereas the current Network Condition Number (NCN) for the paved road network is 48.0, which means that it is in a poor (30-50) condition. Therefore, more than 3 million vehicles are subjected to poor state of roads every day, being paved roads or non-paved roads in the EC province. The narrative therefore results to adversely affect the economic growth and business investment to the province, since transportation plays a very pivotal role on economic development and growth in our communities.

On Table 1 below the previous financial year allocation and expenditure over the years has been indicated. The context of the report is based on the allocation for upgrades and additions over the financial years which has a downward trajectory, which makes decisions on how the works (inhouse or outsourced) are implemented more critical. The issue of maintaining and upgrading the high volume and magnitude of gravel roads in the province is pertinent.

Table 1: Summary of the Eastern Cape DoT provincial infrastructure payments & estimates by category

R thousand	Outcome			Main appropriation	Adjusted appropriation 2020/21	Revised estimate	Medium-term estimates			% change from 2020/21
	2017/18	2018/19	2019/20				2021/22	2022/23	2023/24	
Existing infrastructure assets	2 277 607	1 902 194	2 122 421	2 278 403	2 081 603	2 105 789	2 272 810	1 999 328	1 953 764	7.5
Maintenance and repairs	1 099 320	1 334 957	1 642 162	1 452 848	1 350 240	1 362 872	1 383 373	1 335 161	1 393 908	1.5
Upgrades and additions	1 178 287	563 907	477 244	820 854	726 662	737 673	889 437	660 128	555 635	20.6
Refurbishment and rehabilitation	-	3 330	3 015	4 701	4 701	5 244	-	4 039	4 221	(100.0)
New infrastructure assets	-	-	872	30 000	2 000	2 884	63 171	21 196	22 124	2090.1
Infrastructure transfers	-	-	-	-	-	-	-	-	-	-
Current	-	-	-	-	-	-	-	-	-	-
Capital	-	-	-	-	-	-	-	-	-	-
Infrastructure payments for financial assets	-	-	-	-	-	-	-	-	-	-
Infrastructure leases	-	-	-	-	-	-	-	-	-	-
Non infrastructure	4 920	5 711	-	-	-	-	-	-	-	-
Total department infrastructure	2 282 527	1 907 905	2 123 294	2 308 403	2 083 603	2 108 673	2 335 981	2 020 524	1 975 888	10.8

The Eastern Cape Department of Transport (ECDOT) as part of its mandate, and through cabinet resolutions, as promulgated by Road Transport Act 2013, section 3 that makes provision for the road systems of improvement of road safety and transport efficiency as well as the reduction of costs relating to administering road transportation. The act therefore ensures efficient and effective delivery of services to its clients and proper utilization by its stakeholders.

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DoRA also promulgates the strategic goal of efficient and effective investment in provincial roads to implement the Road Infrastructure Strategic Framework for South Africa (RISFSA) in line with the provincial and national roads program. The performance and expenditure of the Eastern Cape's Provincial Roads was subjected to a review process, to test the feasibility of upgrading the existing gravel road network (unpaved) to surface roads networks (paved).

However, the current funding available for roads and storm water infrastructure is insufficient for meeting existing maintenance and rehabilitation requirements in the sector as indicated on Table 1. There is therefore a need for better prioritization on available budgets to effectively deal with its core services and manage competing needs. If improvements to the existing roads infrastructure are not tackled in a robust way, either by increasing budget allocations the department will be faced with increasing backlogs which will further compromise general service delivery and undermine economic growth.

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1. Introduction

1.1. Problem Statement

The protracted duration of implementation of gravel roads upgrades to surfaced roads within the EC Province remains a challenge. This becomes the root cause of perpetual inflation of time, and funding spent on maintenance of provincial roads, which are largely gravel roads and are susceptible to dilapidate earlier than their design period and life span expected, taking into cognisance the stupendous volume of traffic on gravel roads networks, within the province and cost pressure exerted on maintenance of the gravel roads.

This report seeks to evaluate the value created in the implementation of the upgrading of gravel roads to surfaced roads in the Eastern Cape Province. The Department of Transport (DoT) in the Eastern Cape implements the upgrading of gravel roads to surface standard either by implementing outsourced construction or in-house construction. Thus, the report embarked on a research analogy between the inhouse and outsourced model, in deciphering the pros and cons gleaned from the operative point of view and spending patterns, in acquisitioning the services rendered by the department.

1.2. Synopsis and background

The main purpose of the Department of Transport (DoT) in the province of the Eastern Cape is to promote accessibility and the safe, affordable movement of people, goods, and services. This requires the delivery and maintenance of transport infrastructure that is sustainable, integrated and environmentally sensitive, which supports and facilitates social empowerment and economic growth in the province.

The research reviewed: -

- Expenditure patterns and behaviours used in the past 4 financial years, covering period from 2016/17 to 2020/21.
- Collaboration with the department's officials (both technical and finance personnel)

Table 2 provides the targets from the End of the Year (EoY) report of the programme to test performance over a financial year. This clearly indicates that the programme was nowhere close to where the performance was envisaged by the end of the financial year. This is also the tool utilised on the analysis of the performance for efficient utilisation of budgets congruent to the output in kilometre length achieved at the end of the financial year as planned and reflected in Table 8, that reflects expenditure made on 20/21 financial year of R662 893 499,41. It is therefore a bit worrisome when making the comparison of the output and the expenditure made on that financial year.

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Table 2: Annual Performance Plan (APP) 20/21

Sub –programme 2.4- Construction							
Outcome	Output	Output Indicator	Audited Actual Performance 2018	Audited Actual Performance 2019	Planned Annual Target 2020	Actual Achievement 2020	Deviation from planned target to Actual achievement 2020
Improved provincial Transport infrastructure	Construction of transport related facilities	Number of kilometres of gravel roads upgraded to surfaced roads	23,4	13	26	8km	18km

Table 2 illustrates kilometres completed in a financial year for both in-house & outsourced projects. Based on the End of Year (EoY) report. The target of 13km for each delivery model was unattainable for the outsourced construction project due to the appointed service provider that went into business rescue and subsequently terminated due to non-performance.

The reflected performance by in-house resulted to non-achievement of 6,5km for WCM: Madwaleni Hospital Rd (Ph2) and 2km DIV RD 08041: Cofimvaba-Asketon during 20/21 financial year. This resulted to low performance of only 8km road length completed against 26km length target when the two combined, based on the Annual Performance Plan (APP) 20/21.

1.3. The context of the topic under review

The Eastern Cape (EC) Province has approximately 40 000 km's of the Provincial Road Networks, of which less than almost 5 000 km of the network constitutes surfaced roads. This has adversely affected the provincial road network where only about 10% of provincial roads (excluding minor roads) surfaced compared with the rest of the country as shown on Table 3 from the Road Asset Maintenance Plan (RAMP), the province has also below average of 26% surfaced road compared with the rest of the country.

Leveraging from the outcomes among other reason will vehemently contribute to the improved equitable share, based on asset inventory value increase by the EC province from the National fiscal. It is therefore well documented that most (90.2%, or 36 642.17km) of the roads network in the Eastern Cape are unpaved roads that can be classified as either gravel roads (61.0% or 24 780.45km), earth roads (1.7% or 704.77km) or tracks (6.3% or 2 566.67km), which adversely affects the budgets allocated or inward movement of funds from National Treasury to the province.

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Table 3: Provincial Road Networks that constitutes surfaced roads for the entire country (National DoT, 2010)

Province	Network constitutes surfaced roads
NC	14%
FS	23%
NW	25%
KZN	25%
LP	34%
WC	37%
MP	38%
GP	75%
Average for the entire country	26%

Meanwhile, the resources to address all the backlogs of upgrading, maintenance or new infrastructure are inherently limited. Resulting to inefficiencies which are resulting to poor outcomes when compared to funding allocated to the program (no value for money), in the process of implementing infrastructure projects backlogs. Table 4 below is making clear definition on the terms used as abstracted from the Technical Manual for Highways (TMH)

Table 4: Definitions of roads activities as applied in TMH22 (COTO, 2013)

Category	Sub-category	Definition in TMH22
Routine maintenance	Cyclical	Routine cyclical activities carried out on daily basis (blading, drainage maintenance, road reserve and vegetation maintenance, maintenance of ancillary components)
	Condition-based	Condition- or event-driven activities carried out at short notice (drainage repair, waterway repair, crack sealing and patching, repair of cut-and-fill slopes, reinstatement of line markings, minor repair of structures, spot regravelling, reshaping unpaved roads)
Periodic maintenance	Periodic maintenance	Long-term cyclical activities, including surfacing rejuvenation and thin slurries
	Resurfacing	Regravelling, resealing pavement surface using chip and spray or thin overlay
Special maintenance	Special maintenance	Resurfacing preceded by extensive patching and repair, major damage repair
Rehabilitation	Rehabilitation	Repairs to pavement to restore condition and functionality
	Reconstruction	Reconstruction or replacement of asset
Betterment		Upgrades to elements of asset, such as alignment and drainage improvements, intersection improvements, accident black spot elimination, bridge strengthening
Expansion		Increase in number of lanes (including structures)
Upgrading		Change in road type
New roads		
Ancillary assets		Weighbridges or other major ancillary assets

The roads in this study are in the Special Maintenance or Rehabilitation categories. However, the upgrading of gravel roads to paved roads has many design standards that could not be determined in this report, sighting the following: -

- Standards of the gravel base

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- Design standard of the seal layer,
- Bitumen-treated base and asphalt layer, and or concrete base.
- Detailed technical description of the type of design and work conducted

The sample size (only 4 projects per category) for comparison is also limited and thus the findings could be set aside for review. The approach was to isolate cost components of each project to be able to compare the projects as outlined on Table 5, whereas for this study only output descriptors used is the road length in kilometers: -

Table 5: Scope of works evaluated on the report per category

Component	Included	Excluded
Studies, design, land acquisition and environmental costs prior to construction		√
Contractor's establishment and mobilization (P&G's)	√	
Mass earthworks	√	
Structures - Major and minor bridges and structures, larger culverts		√
Small culverts and drainage	√	
Accesses and junctions	√	
Pavement courses	√	
Shoulder works; and Ancillary Road works	√	
Mechanical, electrical, and control equipment	√	
Installation and commissioning (including dayworks)	√	

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2. Policy and Institutional Information

The National DoT plays a largely facilitative and regulatory role in the provincial roads sector, whereas the EC Department of Transport (DOT) is responsible for consolidating the laws relating to provincial roads in the Province of the Eastern Cape and implement as outlined below:

- Government Immovable Asset Management Act, No 19 of 2007 (GIAMA)
- Provincial Road Maintenance Grant (PRMG)
- Division of Revenue Act (DORA)
- Public Finance Management Act (PFMA)
- Municipal Finance Management Act (MFMA)
- International Finance Reporting Standards (IFRS)
- Generally Recognised Accounting Practices (GRAP)
- Integrated Governmental Relations Act (IGR)
- S'hamba Sonke project implementation guidelines
- Expanded Public Works Programme (EPWP) project implementation guidelines
- DPLG Asset Management Guidelines
- Local Government Capital Asset Management Guideline
- International Standards Organisation (ISO)
- IMIESA - International Infrastructure Management Manual
- Dust roads - Guide to Asset Management
- AASHTO - Transportation Asset Management Guide
- TRH 26 - South African Road Classification and Access Management (RCAM) Manual

EC Department of Transport (DOT) is also responsible to provide for the planning, design, development, construction, financing, management, control, maintenance, protection, and rehabilitation of provincial roads in the Province of the Eastern Cape. However, some roads infrastructure is implemented by public entities (SANRAL).

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3. Institutional arrangements

3.1. Governance and reporting practices mapping within and between spheres

Schedules 4 and 5 of the Constitution outline the various transport and road infrastructure functions of the different spheres of government. In terms of Part A of Schedule 5 of the Constitution, provincial roads and traffic are an exclusive provincial function, while municipal roads, traffic and parking are municipal functions in terms of Part B of Schedule 5. The national Department of Transport plays a largely facilitative and regulatory role. It is responsible for the development of policy and the legislative framework that is implemented through provincial departments, local government, and public entities.

Effective institutional arrangements and proper coordination remain a challenge in road infrastructure delivery due to the broad constitutional assignment of functions for roads. The challenge emanates from the fact that national roads pass through provincial and municipal areas and provincial roads are located within municipal areas. The expansion of a road network needs to be communicated across all spheres to achieve alignment within the context of integrated road and transport planning.

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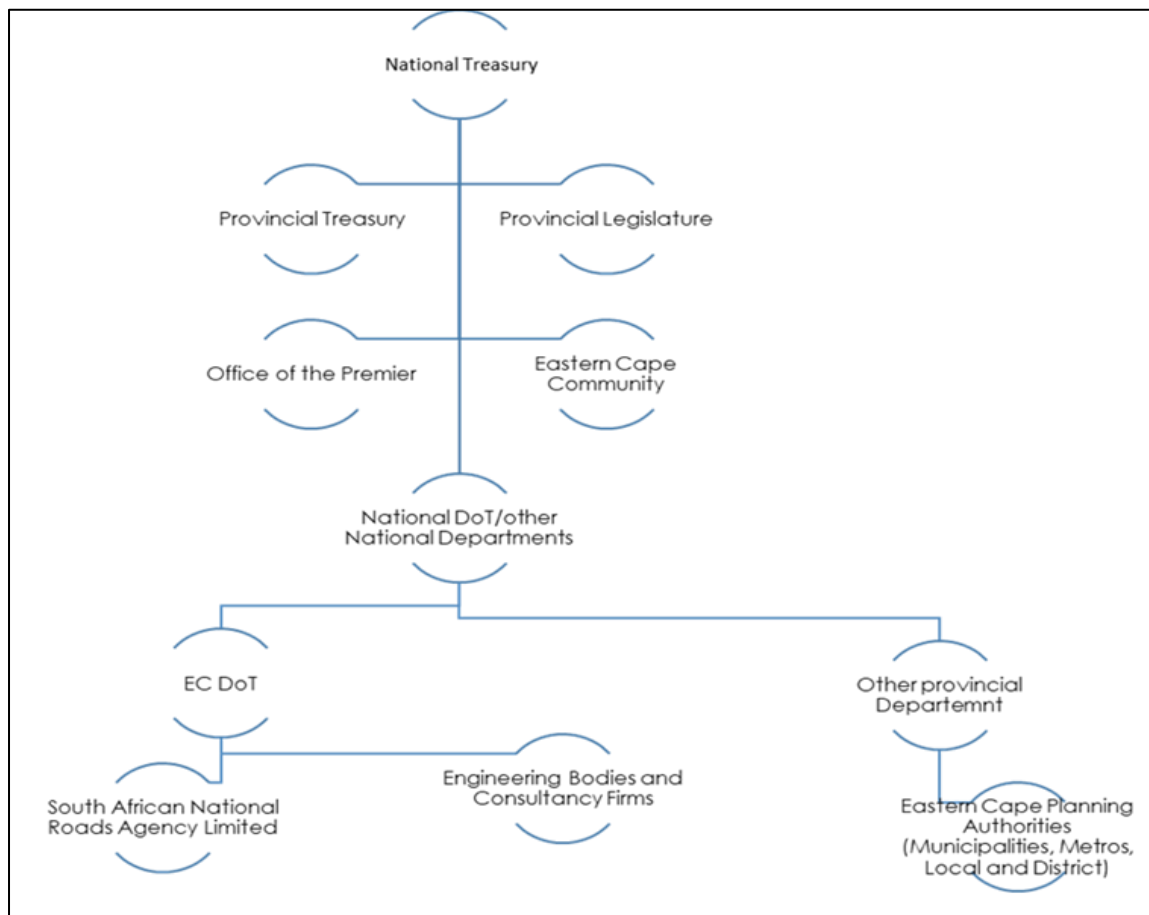


Figure 1: Eastern Cape institutional formation

The various role players in (national and) provincial roads are as follows:

- The national Department of Transport is responsible for developing policies, strategies, plans and guidelines to assist the roads authorities.
- SANRAL collates provincial road data and, in some instances, acts as a consultant or contractor to the provinces.
- Provincial roads authorities gather and maintain data on the extent and condition of roads assets and on road usage; plan, priorities, and schedule projects; implement or outsource roads activities via consultants or directly to contractors; and monitor and report on these.
- Consultants generally prepare project designs, identify contractors to undertake work, manage the construction works, hand over the completed works to the road's authorities, and then close out the projects.

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- Contractors carry out most of the road's activities on behalf of the provincial road's authorities as outlined in Figure 1.

3.2. Maps the flow of funds from and across different sources and institutions

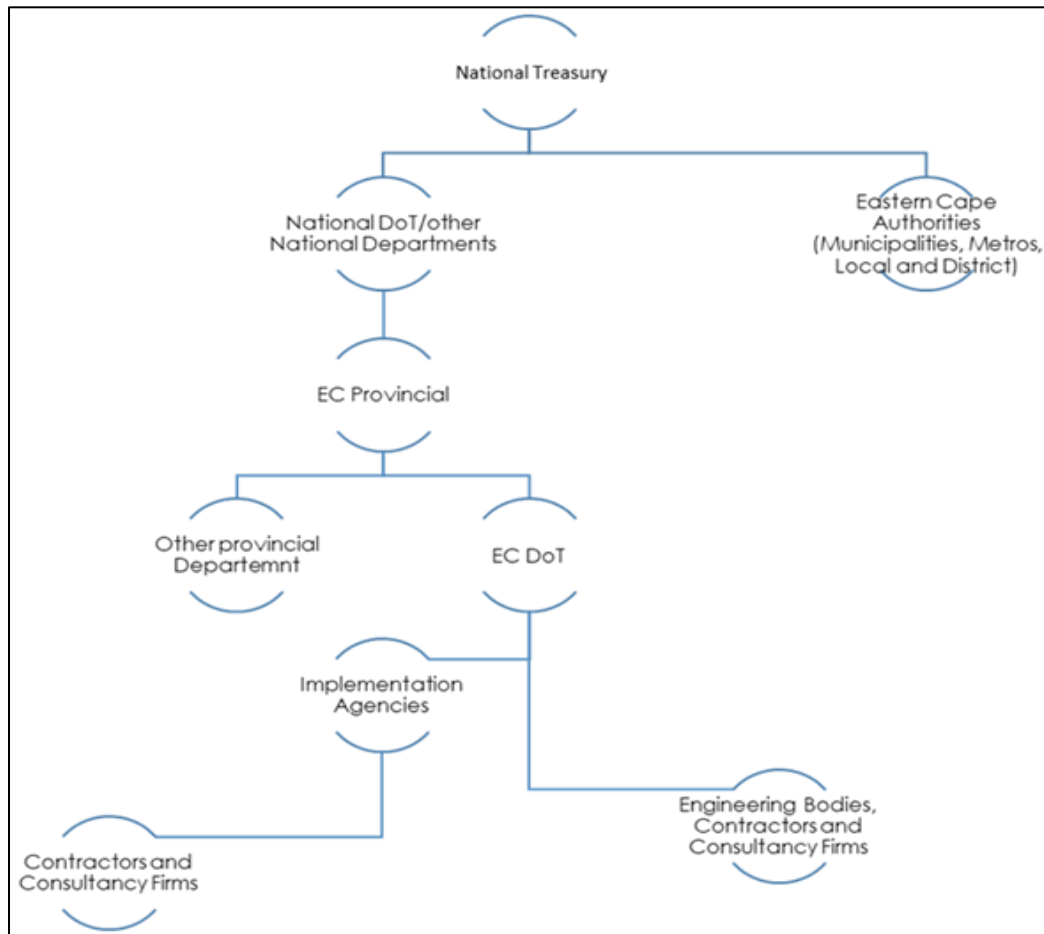


Figure 2: Institutional flow of funds

3.3. Identified potential for savings and efficient improvements

- The ability to identify the activities that can be outsourced under projects that are in house implemented to be able to save time and cost.
- The ability to identify the outsourced activities that can be implemented in-house to save cost that can be outrageous when outsourced.
- The ability to efficiently allocate the internal human capital, plant and equipment on activities that can result to efficacy on all internal resources.

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3.4. Programme Stakeholders

- 6 519 0000 people of the Eastern Cape Province
- Road Users (motorists, pedestrians, and cyclists)
- Public Transport Operators
- Freight Haulage Industry
- Landowners (private farm owners)

3.5. Departmental structural makeup

Figure 3 below seeks to outline the chain of command in rendering the services of the department on its entirety. But the main focus will be on the left red side of the organogram shown. The delivery or line function of the department is executed under Transport Infrastructure, Operation and Regulation, Government Fleet Management and 6 District Directorates, whereas the right blue side of the structure is the support or transversal to the functioning of the department.

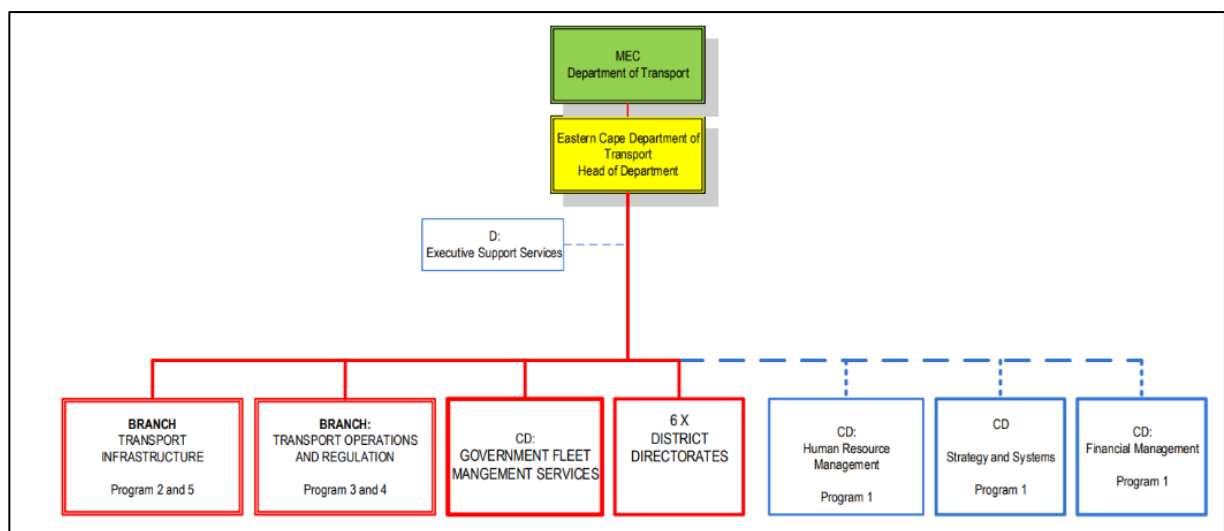


Figure 3: Departmental organogram

The chain of delivery therefore curtailed and aligned to the Transport Infrastructure branch, wherein the focus of the branch is to plan, construct and maintain the road infrastructure within the province of the Eastern Cape. Thus, program 2, under the Chief Directorate Transport Infrastructure Construction is the primary focus to conduct the spending review on as per the problem statement of this report. The detailed organogram is appended on the Appendices of this report, to highlight the structural Human resource composition of the In-house & Outsource units.

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3.5.1. In-house Personnel Expenditure

Table 6: Personnel Expenditure

Source: PERSAL Report

Post Level Description	Full Time Equivalent			Salary Amount		
	2018/04/01	2019/04/01	2020/04/01	2018/04/01	2019/04/01	2020/04/01
CHIEF DIRECTOR	1	2	2	1 417 745	2 976 845	2 737 994
DIRECTOR	0	1	1	572 839	1 137 209	1 086 385
DEPUTY DIRECTOR	5	7	9	5 067 747	7 018 859	8 435 193
ASSISTANT DIRECTOR	12	16	16	8 427 587	11 392 900	10 862 465
JUNIOR MANAGEMENT	75	92	85	33 404 288	40 630 101	36 790 907
LOW LVL SUPERVISION & PRD	618	795	754	147 218 192	195 628 514	185 878 601
UNCLASSIFIED	106	152	132	60 875 402	88 711 853	76 286 840
Unknown	2	1	9	539 652	637 284	2 982 511
Grand Total	821	1 067	1 008	257 523 453	348 133 565	325 060 895

Table 6 shows number of officials employed, their ranks and salary amount under the transport infrastructure programme. However, the Department indicated that there are huge discrepancies between information captured on PERSAL and the actual personnel information attributed to road infrastructure projects. From this data alone, it is a challenge to evaluate direct labour attributed to in-house projects construction of gravel to surface roads.

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4. Programme Chain of Delivery

4.1. Cost driver elements

The unit cost per kilometer of road varies across provinces, and indeed across projects. Reasons for this variation include:

- Differences in **road class and type** (unpaved or paved, single or dual carriageway & freeway), i.e., paved roads typically cost more than gravel roads.
- Differences in road usage & traffic volumes, meaning roads designed to withstand greater usage are more expensive than those designed for lesser volumes.
- Rainfall and climatic conditions can be classified as roads in wetter zones cost more. Whereas road surveying, construction and maintenance is limited to the dry periods because during the rainy period not only are erosion risks and dangers are higher (Occupational, Health and Safety), but costs also increase considerably to mitigate the risk and curb the dangers it poses.
- It should also go for note that work is mostly affected by the intensity of precipitation within a certain period rather than the yearly amount of rain.
- The social environment can be attributed to the fact that urban roads cost more than rural roads due to volume designed for or expected on the road and other facts encounter during the construction of roads.
- Differences in road condition cost can also be attributed to roads in a poorer condition are more expensive to repair.
- Differences in topography and underlying geology, referring to underlying soils require the removal of the weak soil; extra structural layer works and/or slope stabilization.
- In addition, materials suitable for the sub-base and base course must be quarried and crushed,
- Existing materials must be strengthened, or suitable materials must be hauled in.
- Environmental constraints
- Condition of existing road
- Encroachments
- Design life
- Alignments
- Project time frame
- Site supervision
- Services (Eskom, Telkom, water etc)
- Cost of materials
- Unforeseen conditions
- Approval of variations

The following are the cost drivers which have greatest impact on final cost comparisons. The Client generally has some control over certain items indicated in Table 7, whereas there are others that

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are not on the control of the client. These are the items that can only need to be accepted and form part of the risk the project might have to be able to exert the mitigations for such risks identified.

Table 7: Cost drivers items comparison

Items not in control	Items controlled by the Client
Number of drainage structures	Road Class
Number of bridges	Design speed (vertical & horizontal alignment)
Geology	Pavement structure (layer works)
Material strengths	Surfacing type
Material quality & durability	Accommodating design alignment
Materials availability & proximity to the project	Road Class
Traffic volume & type	

Sighting the fact that road projects are almost always unique – benchmarking, or getting an “average” is fraught with potential distortions as follows:

- It is a highly technical process, and is only as good as the historical data available,
- One can easily come to incorrect conclusions,
- Requires engineering experience & judgement to determine what is relevant or not,
- Use of a simplistic two-variable metric (R/ km) can be mis-leading,
- It requires complex algorithms per cost criteria/drivers,
- The number of variables can overpower the result,
- Historical values must be regularly corrected for inflation to permit ongoing realistic comparisons.

The information provided by the department does allow for a high-level cost assessment to determine whether it is more efficient to implement these types of projects in-house or outsourced. It is best suited to have a more intensive assessment of each of the roads assessed with more review of all the cost drivers described above. However, with the limited time and information available a first order finding can be made on Table 8.

4.2. List of projects included on the upgrade of gravel roads to surfaced roads

Table 8: List of projects included on the upgrade of gravel roads to surfaced roads by in-house and outsourced in 20/21 from a spreadsheet provided by the department

Project name	Sum of Total Expenditure	STAGE	NO. OF KMS (as per scope of work)	Scope of Work
IN-HOUSE ROAD CONSTRUCTION				
CANZIBE HOSPITAL ROAD	R48 424 419,21	Stage 7 Works	26	Upgrade from gravel to surface

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Project name	Sum of Total Expenditure	STAGE	NO. OF KMS (as per scope of work)	Scope of Work
DIV RD 08041: COFIMVABA-ASKETON	R101 493 089,47	Stage 7 Works	2	Upgrade from gravel to surface
DR 08131 IN QUMBU	R3 854 310,59	Stage 7 Works	6	Brick paving
R72 TO HAMBURG	R19 167 921,97	Stage 7 Works	13,5	Upgrade from gravel to surface
R72 TO HAMBURG CRUSHING	R0,00	Stage 7 Works		Material for upgrade
WCM: COFFEE BAY TO ZITHULELE-IN-H	R49 469 278,86	Stage 7 Works	26	Upgrade from gravel to surface
WCM: MADWALENI HOSP RD(PH2) IN-HOUSE	R36 938 674,27	Stage 7 Works	6,5	Upgrade from gravel to surface
IN-HOUSE ROAD CONSTRUCTION Totals	R259 347 694,37		54	
OUTSOURCED ROAD CONSTRUCTION				
DOT SANRAL MOU/BREIDBACH INTERC	R45 583 775,45	Stage 6- Tender Documentation	5	Upgrading of Breidbach and Belstone Interchange
ELITHENI COAL MINE INDWE	R9 136 476,24	Stage 7 Works	13	Upgrading of 13 kilometres of gravel road to surfaced road and all ancillary works. Contract has been terminated during 2020/2021 FY due to poor performance by Contractor.
HLULEKA NATURE RESERVE	R103 063 289,92	Stage 7 Works	16	Upgrading of 16 kilometres of gravel road to surfaced road and all ancillary works.
MLAMLI HOSPITAL ROAD-PH1	R13 785 823,77	Stage 7 Works	12	Upgrading of 12 kilometres of gravel road to surfaced standard inclusive of 4 bridges
R61: BIZANA TO PT EDWD MGSB-PH3&4	R19 255 929,35	Stage 6 Tender Documentation	8,2	Reconstruction and widening of 8.2 kilometres of surfaced road
R72 TO HAMBURG	R316 490,54			
SLA ENOCH MGJI(ZOLA-T/HILL) PH4	R6 846 647,76	Stage 7 Works	12,5	Upgrading of 12 kilometres of gravel road on DR12733 to surfaced standard
SLA: W/VALE 2 DWESA NR V MSN PH2	R160 465 660,93	Stage 7 Works	15	Upgrading of 15 kilometres of gravel road to surface standard inclusive of 2 Bridges.
T125 PHASE4 N2 TO SIPHETHU HOSP	R44 261 234,13	Stage 7 Works	14	Upgrading of DR08125 from N2 to Siphethu Hospital Ph4
OUTSOURCED ROAD CONST Totals	R403 545 805,04		95,7	

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Project name	Sum of Total Expenditure	STAGE	NO. OF KMS (as per scope of work)	Scope of Work
OVERALL Total	R662 893 499,41			

This spreadsheet was included in the analysis, but the figures do NOT reconcile with the BAS downloads. Both are included in each road assessment. It should also be noted that it is also difficult to determine accurately the “typical” unit cost under the following arguments

- Unit costs are calculated by standardizing projects that are broadly similar, but which differed in their design details and specific circumstances; and
- The size of the project invariably has an overriding effect on the unit rate (economy of scale).

Therefore, for these reasons some of the projects submitted by the department are excluded to able to make similar and close comparison.

4.3. In-house Expenditure Analysis

The Department of Transport utilises its own internal resourcing (plant and labour) in the implementation of projects allocated to in-house unit. The unit is responsible for all the procurement of sub-contractors, material, personnel, and plant hire. Table 9 below illustrates expenditure obtained from BAS for in-house projects construction of gravel to surface roads, covering the period 2016/17 to 2020/21.

Table 9: In-house Projects Expenditure
Source: BAS Report

IN-HOUSE PROJECTS	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	Total
CANZIBE HOSPITAL ROAD			4 990 795	49 545 355	48 424 419	102 960 569
DIV RD 08041:COFIMVABA - ASKETON	24 939 797	42 242 366		106 405 009	101 493 089	275 080 263
DR 08131 IN QUMBU					3 854 311	3 854 311
R72 TO HAMBURG			-	18 839 477	19 484 413	38 323 889
WCM:COFFEE BAY TO ZITHULELE-INH	50 380 473	24 952 012	41 461 535	60 290 076	49 469 279	226 553 375
WCM:MADWALENI HOSP RD(PH2)IN-HOU	37 346 511	27 282 441	12 636 697	62 689 545	36 938 674	176 893 868
WCM:MADWALENI HOSP RD(PH2)QUARY&	17 120 627					17 120 627
Total	129 787 409	94 476 819	59 089 026	297 769 462	259 664 185	840 786 902

Total expenditure of R840 787 million was recorded for in-house projects during the past 5 years. Financial year 2019/20 and 2020/21 recorded the highest expenditure of R297 769million and R259 664 million respectively.

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Table 10: Table 2: In-house project kilometres constructed and completed.

Source: BAS Report

IN-HOUSE PROJECTS	Start Date	Completion Date	Total km under construct	Kilometres completed/ Surfaced	Financial Year Km Completed
CANZIBE HOSPITAL ROAD	Apr-19	Oct-23	26km	3km upgrade	2021/22 FY – 2 nd quarter
DIV RD 08041:COFIMVABA - ASKETON	Apr-11	Mar-26	50.2km	15km upgrade	12km from 2015/16 – 2019/20 FY
R72 TO HAMBURG	Oct-19	Sep-22	13.5km	0km upgrade	N/A
WCM:COFFEE BAY TO ZITHULELE-INH	Apr-12	Mar-23	26km + 5 Major Bridges	8km upgrade + 3 Major Bridges (plus 15 km light rehabilitation)	8km + bridges done from 2014/15 FY to 2019/20 FY
WCM:MADWALENI HOSP RD(PH2)IN-HOU	Apr-19	Oct-21	9km	6km upgrade	2019/20

In Table 10 above, kilometres completed under each project are recorded including time period spent to attain the kilometres. For example, CANZIBE HOSPITAL ROAD construction started in April 2019 for construction of 26km and only 3km were completed as at 2021/22 (2nd quarter). The completion date for the project is October 2023.

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Table 11: Inhouse projects BAS payments

Row Labels	CANZIBE HOSPITAL ROAD	COFFEE BAY/ZITHULELE	COFIMVABA ASKETON	MADWALENI HOSPITAL ROAD	QUMBU DR08131	R72 HAMBURG	Grand Total
CONTRCTR:UPGR&ADD OTHER FIX STR	34 291 740	62 719 750	152 171 935	54 227 348	0	5 078 789	308 489 561
U&A OFST:O/P::RENTAL & HIRING	47 921 222	57 801 528	51 999 139	55 408 538	3 000 000	24 181 959	240 312 386
OWN CONTRCTRS:UPG&ADD OT INF A		42 880 338	15 356 779	36 209 084			94 446 202
U&A OFST:CONTRCTRS:CASUAL LABOUR	6 825 361	15 673 136	18 847 370	8 059 949	349 973	3 277 314	53 033 102
U&A OFST:C/P:ENGIN CIVIL	616 918	20 392 867	3 524 899	7 269 279		581 820	32 385 782
U&A OFST:F/SER: REPAIRS	3 951 424	8 386 281	11 191 469	5 565 586	381 611	566 487	30 042 858
OUTS CONTRCTR:UPGR&ADD BUL&OT FX				17 120 627			17 120 627
U&A OFST:INV:ROAD CONSTR&SUP	3 565 413	3 141 632	2 476 489	5 507 167	0	1 813 540	16 504 241
OWN:CONTRCTRS:CASUAL LABOURERS		4 197 101	4 391 900				8 589 001
U&A OFST:T&S DOM:ACCOMMODATION	848 683	959 772	3 843 580	481 600	0	771 465	6 905 099
U&A OFST:O/P:SAFEGUARD&SECURITY	2 266 756	783 527	1 641 403	1 256 567	0	766 500	6 714 754
OWN:RENTAL & HIRING		2 724 610	3 429 654	226 400			6 380 664
U&A OFST:INV CLOTH:UNIF&PRT CLTH	425 647	1 062 891	1 735 241	499 720	99 631	105 706	3 928 837
U&A OFST:CONS:HEALTH & SAFETY	672 790	664 727	849 117	356 378	0	421 550	2 964 562
U&A OFST:INV:BLDG&CONSTR MAT		2 437 932	497 193				2 935 125
U&A OFST:CONS ROAD LAB SERVICES	364 599	1 068 204	547 287	827 584	23 096	74 277	2 905 047
U&A OFST:INV:ROADS SIGNS	626 177	498 900	512 400		0	670 525	2 308 002
INF&PLN SER:OWN ENGIN CIVIL SERV				889 028			889 028
OWN:INV MAT&SUP:ROAD CONSTR&SUP		358 283	311 722				670 006
OWN:F/SER: REPAIRS		0	592 625	0			592 625
U&A OFST:INV F&G:FUEL,OIL & LUBR	428 746	55 030	0				483 776
U&A OFST:O/P:CONSUMABLE SUPPLIES	25 900	404 329	0	28 150		0	458 379
F/SER: REPAIRS			295 359				295 359
U&A OFST:C/P:INF&PLN SER:LN&QT S	0	21 323	166 028	0		0	187 351
OWN:INV MAT&SUP:SPARES & ACCESS		44 143	136 731				180 873
OWN:LAB SER:ROADS LAB SERV		32 003	114 161				146 164
U&A OFST:C/P:BUS&ADV SER:PRJ:MAN	63 450	0	54 000	0	0	13 959	131 409
U&A OFST:ADVERTISING & ADMIN COST	65 743	34 793	21 779	0		0	122 316
OWN:INV MAT&SUP:ROAD SIGNS		100 000	0	0			100 000
OWN:F/SER:FUEL,OIL&GREASE			99 109				99 109
U&A OFST:CONTRCTRS:FIRE FIGHTING	0	32 201	37 136	28 590		0	97 927
OWN:P/P:CLEANING SERVICES			97 300				97 300
U&A OFST:INV:HARDWARE	0	34 080	24 000	30 900			88 980
OWN:P/P:SAFEGUARD&SECURITY			67 093				67 093
OWN:CONTRCTRS:FIRE FIGHTN SERV		9 377	15 000				24 376
OWN:P/P:GAS		24 000	0				24 000
OWN:INF&PLN SER:LND&QTY SURV SER				21 999			21 999
OWN: CONTRCTRS:MNT&REP OT INF A		0	18 867	0			18 867
OWN:COM:TEL/FAX/TELEGRAP&TELEX		6 911	11 201				18 112
OWN:CONS HOUS SUP:TOILETRIES		1 699	2 296				3 995
OWN:CONS HOUS SUP:BROOM&BRSH		2 009	0				2 009
Grand Total	102 960 569	226 553 375	275 080 263	194 014 495	3 854 311	38 323 889	840 786 902

Table 11 shows the lowest level item spent on under the projects enumerated. It is observed that more activity occurred in the Canzibe Hospital Road, Coffee Bay Road, Cofimvaba Asketon and Madwaleni Hospital Road. The Qumbu and R72 Hamburg reported fewer expenditure items and for the purpose of this exercise, a detailed comparison will be prepared using the projects that have more activity in terms of expenditure items, to get depth understanding of cost behaviour of each project.

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4.3.1. In-house cost drivers

The Department's In-house Construction Unit procures services to augment the shortfalls of the departmental resources.

Table 12: Cost Drivers vs Project Costs
Source: BAS Report

ITEM	CANZIBE HOSPITAL	COFFEE BAY/ZITHULEL	COFIMVABA ASKETON	MADWALENI HOSPITAL	QUMBU DR08131	R72 HAMBURG	TOTAL
CONTRCTR:UPGR&ADD OTHER FIX STR	34 291 740	62 719 750	152 171 935	54 227 348	0	5 078 789	308 489 561
U&A:OFST:O/P::RENTAL & HIRING	47 921 222	57 801 528	51 999 139	55 408 538	3 000 000	24 181 959	240 312 386
OWN CONTRCTRS:UPG&ADD OT INF A	0	49 802 049	23 178 333	53 556 112			94 446 202
TOTAL COST DRIVERS	82 212 961	170 323 327	227 349 407	163 191 997	3 000 000	29 260 748	643 248 149
TOTAL PROJECT COSTS	102 960 569	226 553 375	275 080 263	194 014 495	3 854 311	38 323 889	840 786 902
% COST DRIVERS TO PROJECT COSTS	80%	75%	83%	84%	78%	76%	77%

Table 12 indicates the cost comparison based on item expenditure between the total project cost and the cost drivers to be able to ascertain and understand nature of items utilised by the in-house projects against what has been outsourced.

With reference to table 12, it is observed that the top 3 expenditure items (representing 77%) are outsourced in nature. These outsourced expenditure items consist of:

- Contractor, Upgrade Additions and Other Fixed Structures: This item utilised to pay all subcontractors and SMMEs on site performing different activities that the in-house construction unit cannot execute. The items range from road surfacing items, concrete side road v-drains, fencing, installation/construction of headwalls, etc. Furthermore, professional services required for these projects are outlined on Table 13:

Table 13: Comparison on outsourced and inhouse resources

Outsourced	In-house
Resident Engineer	Occupational Health and safety Officer
Assistant Resident Engineer	Environmental Management Officer
Clerk of Works	
Occupational Health and Safety Agent	

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Environmental Management Agent	
Civil Engineering Material laboratory manager/ technician	

- Rental and Hiring: The items are utilised to hire items that the department does not have or are in short supply and needed for a short to medium term or for a particular project duration. These include:
 - Construction earth moving plant (i.e., Graders, Excavators, Tipper trucks, etc.)
 - Construction small tools (Pedestrian rollers, Plate compactors, concrete vibrators, concrete mixers, generators, etc.)
 - Chemical mobile toilets

Whilst this analysis is not extensive, it is evident that implementation of the in-house programme is primarily outsourced. It is therefore questionable whether the way in-house projects are currently implemented is efficient and economical, considering that additionally to the outsourced expenditures incurred, there are also fixed in-house plant and equipment, personnel, and other costs.

4.3.2. The in-house resourcing

Table 14 shows the salary scales utilised for calculation of in-house personnel costs for each project

Table 14: Salary's per salary scale

Unit_Occ_Classification	Salary_Level_Notch	Avg Salary		
		2018/2019	2019/2020	2020/2021
ROAD WORKERS	2	272 690	206 095	244 090
	3	233 143	234 725	221 151
	4	296 006	280 845	260 119
	5	302 115	309 092	297 618
	6	362 951	354 234	356 626
MIDDLE MANAGERS	7	346 979	387 607	420 271
	8	503 245	508 086	543 077
	9	590 770	615 117	608 617
	10	702 181	679 319	705 666
	11	871 900	888 372	882 169
ENGINEERS AND RELATED PROFESSIONALS	12	1 206 806	1 255 798	1 243 409
SENIOR MANAGERS	13	1 718 518	1 137 209	1 086 386
	14	1 386 028	1 641 741	1 430 724

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The department provided salary officials per project and permanent employees are costed based on salary scales presented in table 14. The total average was used to allocate personnel costs for each year proportional to project costs – see summary below.

Table 15: Canzibe Hospital Road

CANZIBE HOSPITAL ROAD							
PERSONNEL COSTS (Pro Rata allocation)			R809 250	R3 622 747	R1 128 357		
POSITION	PERMANENT/CONTRACT/ EXTER	SALARY LEVEL	2018/2019	2019/2020	2020/2021	Total	Average
Project manager (Emp)	Permanent	11	R871 900	R888 372	R882 169	R2 642 441	R880 814
Project Leader	Permanent	9	R590 770	R615 117	R608 617	R1 814 504	R604 835
Construction Manager (CM)	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
Assistant CM (External)	External					R0	
Surveyor	Permanent	6	R362 951	R354 234	R356 626	R1 073 811	R357 937
Earthworks Foreman	External					R0	
Roadworks Foreman	Permanent	6	R362 951	R354 234	R356 626	R1 073 811	R357 937
Artisan Foreman	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
Traffic Safety Officer	External					R0	
OHS	Permanent	7	R346 979	R387 607	R420 271	R1 154 856	R384 952
Total			R3 542 042	R3 615 734	R3 710 464	R10 868 240	R3 622 747

Table 16: Madwaleni Hospital Road

MADWALENI HOSPITAL ROAD							
PERSONNEL COSTS (Pro Rata allocation)			R1 878 390	R1 904 543	R1 968 323		
POSITION	PERMANENT/CONTRACT/ EXTER	SALARY LEVEL	2018/2019	2019/2020	2020/2021	Total	Average
Project manager (Emp)	Permanent	11	R871 900	R888 372	R882 169	R2 642 441	R880 814
Construction Manager (External)	External					R0	
Assistant CM (External)	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
Surveyor	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
OHS (External)	External					R0	
Transport Safety Officer (External)	External					R0	
Total			R1 878 390	R1 904 543	R1 968 323	R5 751 257	R1 917 086

Table 17: Coffee Bay/Zithulele

COFFEE BAY/ZITHULELE							
PERSONNEL COSTS (Pro Rata allocation)			R1 010 335	R3 740 649	R548 019	R359 557	
POSITION	PERMANENT/CONTRACT/ EXTER	SALARY LEVEL	2018/2019	2019/2020	2020/2021	Total	Average
Project manager (Emp)	Permanent	11	R871 900	R888 372	R882 169	R2 642 441	R880 814
Site Manager	Permanent	10	R702 181	R679 319	R705 666	R2 087 166	R695 722
Assistant Site Manager	Permanent	7	R346 979	R387 607	R420 271	R1 154 856	R384 952
Mechanical Technician	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
Structure Superintendent	Permanent	7	R346 979	R387 607	R420 271	R1 154 856	R384 952
Senior Foreman	Permanent	6	R362 951	R354 234	R356 626	R1 073 811	R357 937
Surveyor	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
Total			R3 637 480	R3 713 310	R3 871 157	R11 221 946	R3 740 649

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Table 18: Cofimvaba Asketon

COFIMVABA ASKETON							
PERSONNEL COSTS (Pro Rata allocation)			R2 825 288	R4 280 739	R4 426 611		
POSITION	PERMANENT/C	SALARY LEVEL	2018/2019	2019/2020	2020/2021	TOTAL	AVERAGE
Project manager (Emp)	Permanent	11	R871 900	R888 372	R882 169	R2 642 441	R880 814
Construction Manager	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
Surveyor	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
Site Technician	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
OHS	Permanent	7	R346 979	R387 607	R420 271	R1 154 856	R384 952
General Foreman	Permanent	6	R362 951	R354 234	R356 626	R1 073 811	R357 937
Structural Artisan	Permanent	8	R503 245	R508 086	R543 077	R1 554 408	R518 136
Structural Foreman	Permanent	5	R302 115	R309 092	R297 618	R908 825	R302 942
Roadworks Foreman	Permanent	5	R302 115	R309 092	R297 618	R908 825	R302 942
Total	Total		R4 199 041	R4 280 739	R4 426 611	R12 906 392	R4 302 131

4.3.3. In-house Construction (IHC) Plant Hire

In-house Construction (IHC) Plant Availability Split between hired and IHC plant

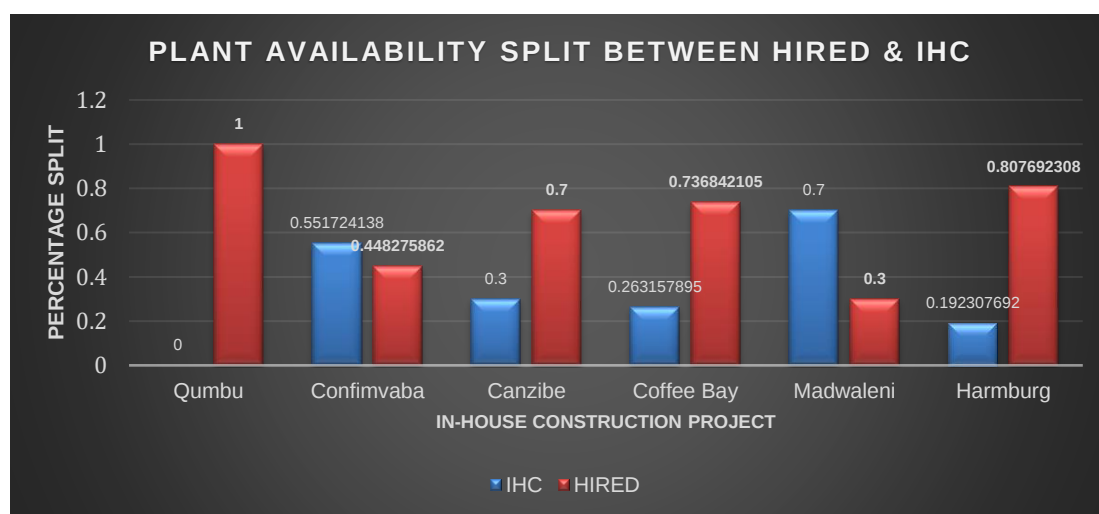


Figure 4: The IHC plant reflects the operational plant only on site

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Table 19: Inhouse construction plant available

IN-HOUSE CONSTRUCTION																									
HIRED AND IHC PLANT																									
Issued:																									
IN-HOUSE CONSTRUCTION - PLANT AVAILABILITY (HIRED VS IN-HOUSE)																									
1.0 In-house Construction (IHC) Plant Availability Statistics																									
		QUMBU				COFIMVABA				CANZIBE				COFFEE BAY				MADWALENI				HARMBURG			
		HIRED	IHC	TOTAL	%IHC	HIRED	IHC	TOTAL	%IHC	HIRED	IHC	TOTAL	%IHC	HIRED	IHC	TOTAL	%IHC	HIRED	IHC	TOTAL	%IHC	HIRED	IHC	TOTAL	%IHC
1	Graders	2		2	0%	2	3	5	60%	1	2	3	67%	3	2	5	40%		1	1	100%	2	2	4	50%
2	Excavator	2		2	0%	3	3	6	50%	1	1	2	50%	5	1	6	17%		1	1	100%	1	0	1	0%
3	Water Truck	2		2	0%	4	4	8	50%	4	1	5	20%		1	1	100%		2	2	100%	1	1	2	50%
4	Grid Roller	2		2	0%				0%	0	0		0%				0%				0%	1	0	1	0%
5	Smooth Roller	1		1	0%	3	1	4	25%	2	1	3	33%	8	1	9	11%	1		1	0%	4	0	4	0%
6	TLB	1		1	0%	1		1	0%	1	0	1	0%				0%		1	1	100%	1	0	1	0%
7	Tipper truck	6		6	0%	7	3	10	30%	5	0	5	0%	10	2	12	17%		1	1	100%	10	0	10	0%
8	Loader				0%		1	1	100%		1	1	100%	1	1	2	50%				0%				0%
9	Padfoot Roller				0%				0%				0%		1	1	100%	1		1	0%				0%
10	Dumper Truck				0%	2	1	3	33%				0%				0%				0%				0%
11	Broom				0%				0%				0%				0%				0%				0%
12	Chipspreader				0%				0%				0%				0%				0%				0%
13	Bitumen Truck				0%				0%				0%				0%				0%				0%
14	Recycler				0%		1	1	100%				0%				0%				0%				0%
15	Crane truck				0%	1	1	2	50%				0%		1	1	100%		1	1	100%				0%
16	Service truck				0%				0%				0%				0%				0%				0%
17	Platform truck				0%				0%				0%				0%				0%				0%
18	Lowbed truck				0%		1	1	100%				0%				0%				0%				0%
19	Bus				0%		2	2	100%				0%				0%				0%		1	1	100%
20	Vans				0%		11	11	100%				0%				0%				0%		1	1	100%
21	Dozer				0%	1		1	0%				0%	1		1	0%				0%	1		1	0%
22	Cocrete Mixer				0%	1		1	0%				0%				0%				0%				0%
23	Pneumatic Roller				0%	1		1	0%				0%				0%	1		1	0%				0%
		16	0	16	0%	26	32	58	55%	14	6	20	30%	28	10	38	28%	3	7	10	70%	21	5	26	19%

The department hires plant for a short to medium term or for a particular project duration. Table 19 above shows proportion of plant hire in respect of equipment used for each project. It is observed that Cofimvaba Asketon and Madwaleni projects utilised more than 50% of in-house plant and equipment, whilst other projects plant was mostly hired.

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4.3.4. In-house Project Analysis

i. Canzibe Hospital Road

Table 20: Canzibe Hospital Road BAS items

CANZIBE HOSPITAL ROAD	2018/2019	2019/2020	2020/2021	
CONTRCTR:UPGR&ADD OTHER FIX STR	R4 990 795	R22 342 159	R6 958 786	
U&A OFST:ADVERTISNG & ADMIN COST		R65 743	R0	
U&A OFST:C/P:BUS&ADV SER:PRJ:MAN		R45 900	R17 550	
U&A OFST:C/P:ENGIN CIVIL		R616 918		
U&A OFST:CONS ROAD LAB SERVICES		R66 977	R297 622	
U&A OFST:CONS:HEALTH & SAFETY		R523 371	R149 420	
U&A OFST:CONTRCTRS:CASUAL LABOUR		R3 626 181	R3 199 180	
U&A OFST:F/SER: REPAIRS		R1 980 660	R1 970 763	
U&A OFST:INV CLOTH:UNIF&PRT CLTH		R190 441	R235 206	
U&A OFST:INV F&G:FUEL,OIL & LUBR		R428 746		
U&A OFST:INV:ROAD CONSTR&SUP		R2 119 006	R1 446 407	
U&A OFST:INV:ROADS SIGNS		R474 170	R152 007	
U&A OFST:T&S DOM:ACCOMMODATION		R297 709	R550 975	
U&A:OFST:O/P::RENTAL & HIRING		R16 316 435	R31 604 787	
U&A:OFST:O/P:CONSUMABLE SUPPLIES		R25 900		
U&A:OFST:O/P:SAFEGUARD&SECURITY		R425 040	R1 841 716	
PLANT INHOUSE		R6 992 758	R13 544 909	
PERSONNEL COSTS	R809 250	R3 622 747	R1 128 357	
Grand Total	R5 800 044	R60 160 859	R63 097 685	R129 058 588
Total expenditure as per DOT supporting docs	R0	R22 932 289	R48 310 146	R71 242 435

Kilometres completed/ Surfaced = 3km

Cost / Km = R43 019 529

Note this average cost is high as there has been work done on the whole length of the road and the 3km completed.

Start Date	Completion Date
Apr-19	Oct-23

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ii. Madwaleni Hospital Road

Table 21: Madwaleni Hospital Road BAS items

MADWALENI HOSPITAL ROAD	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	
CONTRCTR:UPGR&ADD OTHER FIX STR		R24 763 049	R12 636 697	R7 980 488	R8 847 115	
INF&PLN SER:OWN ENGIN CIVIL SERV	R889 028					
OUTS CONTRCTR:UPGR&ADD BUL&OT FX	R17 120 627					
OWN CONTRCTRS:UPG&ADD OT INF A	R36 209 084					
OWN:INF&PLN SER:LND&QTY SURV SER	R21 999					
OWN:RENTAL & HIRING	R226 400					
U&A OFST:C/P:ENGIN CIVIL		R2 519 392		R2 240 186	R2 509 701	
U&A OFST:CONS ROAD LAB SERVICES				R239 507	R588 077	
U&A OFST:CONS:HEALTH & SAFETY				R356 378	R0	
U&A OFST:CONTRCTRS:CASUAL LABOUR				R6 009 982	R2 049 967	
U&A OFST:CONTRCTRS:FIRE FIGHTING				R28 590		
U&A OFST:F/SER: REPAIRS				R4 565 586	R1 000 000	
U&A OFST:INV CLOTH:UNIF&PRT CLTH				R499 720		
U&A OFST:INV:HARDWARE				R30 900		
U&A OFST:INV:ROAD CONSTR&SUP				R4 774 031	R733 137	
U&A OFST:T&S DOM:ACCOMMODATION				R481 600		
U&A:OFST:O/P::RENTAL & HIRING				R34 937 640	R20 470 898	
U&A:OFST:O/P:CONSUMABLE SUPPLIES				R28 150		
U&A:OFST:O/P:SAFEGUARD&SECURITY				R516 787	R739 780	
PLANT INHOUSE				R81 521 161	R47 765 428	
PERSONNEL COSTS			R1 878 390	R1 904 543	R1 968 323	
Grand Total	R54 467 138	R27 282 441	R14 515 087	R146 115 249	R86 672 425	R247 302 762
Total expenditure as per DOT supporting docs			R11 502 625	R62 689 545	R36 938 674	R111 130 844

Table 22: Madwaleni cost comparison over km completed & under construction

Total km under construction	Kilometres completed/ Surfaced	Financial Year Km Completed
9km	6km	2019/20

For calculation 13km used as completion date Oct 2021 and total is 15km 2016/17 and 2017/18 are excluded as the structures were done in those years

Cost / Km = R19 023 289

Start Date	Completion Date
2019/04/01	2021/10/01

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iii. Coffee Bay / Zithulele

Table 23: Coffee Bay/Zithulele BAS items

COFFEE BAY/ZITHULELE	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	
CONTRCTR:UPGR&ADD OTHER FIX STR		R11 198 600	R41 461 535	R6 074 273	R3 985 343	
OWN CONTRCTRS:UPG&ADD OT INF A	R42 880 338					
OWN:COM:TEL/FAX/TELEGRAP&TELEX	R6 911					
OWN:CONS HOUS SUP:BROOM&BRSH	R2 009					
OWN:CONS HOUS SUP:TOILETRIES	R1 699					
OWN:CONTRCTRS:CASUAL LABOURERS	R4 197 101					
OWN:CONTRCTRS:FIRE FIGHTN SERV	R9 377					
OWN:INV MAT&SUP:ROAD CONSTR&SUP	R358 283					
OWN:INV MAT&SUP:ROAD SIGNS	R100 000					
OWN:INV MAT&SUP:SPARES & ACCESS	R44 143					
OWN:LAB SER:ROADS LAB SERV	R32 003					
OWN:P/P:GAS	R24 000					
OWN:RENTAL & HIRING	R2 724 610					
U&A OFST:ADVERTISNG & ADMIN COST		R0		R34 793	R0	
U&A OFST:C/P:ENGIN CIVIL				R14 053 884	R6 338 983	
U&A OFST:C/P:INF&PLN SER:LN&QT S		R0		R21 323	R0	
U&A OFST:CONS ROAD LAB SERVICES		R177 706		R426 551	R463 947	
U&A OFST:CONS:HEALTH & SAFETY		R138 852		R176 556	R349 319	
U&A OFST:CONTRCTRS:CASUAL LABOUR		R7 072 408		R5 752 078	R2 848 650	
U&A OFST:CONTRCTRS:FIRE FIGHTING		R8 031		R24 170	R0	
U&A OFST:F/SER: REPAIRS		R2 993 509		R4 626 448	R766 325	
U&A OFST:INV CLOTH:UNIF&PRT CLTH		R361 486		R251 893	R449 512	
U&A OFST:INV F&G:FUEL,OIL & LUBR		R55 030				
U&A OFST:INV:BLDG&CONSTR MAT		R2 437 932				
U&A OFST:INV:HARDWARE				R34 080		
U&A OFST:INV:ROAD CONSTR&SUP				R3 141 632	R0	
U&A OFST:INV:ROADS SIGNS					R498 900	
U&A OFST:T&S DOM:ACCOMMODATION		R484 747		R96 320	R378 705	
U&A:OFST:O/P::RENTAL & HIRING		R23 712		R24 933 805	R32 844 010	
U&A:OFST:O/P:CONSUMABLE SUPPLIES				R370 042	R34 287	
U&A:OFST:O/P:SAFEGUARD&SECURITY				R272 229	R511 298	
PLANT INHOUSE	R957 295	R8 331	R0	R8 760 526	R11 539 787	
PERSONNEL COSTS		R1 010 335	R3 740 649	R548 019	R359 557	
Grand Total	R50 380 473	R24 952 012	R41 461 535	R60 290 076	R49 469 279	R151 220 890
Total expenditure as per DOT supporting docs			R16 006 636	R60 318 004	R48 151 327	R124 475 967

Table 24: Coffee Bay/Zithulele cost comparison

Total km under construction	Kilometres completed/ Surfaced	Financial Year Km Completed
26km + 5 Major Bridges	8km upgrade	2014/15-2019/20
	3 major Bridges	2014/15-2019/21

For calculation 8km used for 2016/17 and 2017/18 are excluded as the structures were done in those years

Cost / Km = R18 902 611

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Start Date	Completion Date
2012/04/01	2023/03/01

iv. Cofimvaba Asketon

Table 25: Cofimvaba Asketon BAS items

COFIMVABA ASKETON	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	
CONTRCTR:UPGR&ADD OTHER FIX STR		R26 454 351		R61 642 357	R64 075 227	
F/SER: REPAIRS	R295 359					
OWN CONTRCTRS:UPG&ADD OT INF A	R15 356 779					
OWN: CONTRCTRS:MNT&REP OT INF A	R18 867					
OWN:COM:TEL/FAX/TELEGRAP&TELEX	R11 201					
OWN:CONS HOUS SUP:TOILETRIES	R2 296					
OWN:CONTRCTRS:CASUAL LABOURERS	R4 391 900					
OWN:CONTRCTRS:FIRE FIGHTN SERV	R15 000					
OWN:F/SER: REPAIRS	R592 625					
OWN:F/SER:FUEL,OIL&GREASE	R99 109					
OWN:INV MAT&SUP:ROAD CONSTR&SUP	R311 722					
OWN:INV MAT&SUP:SPARES & ACCESS	R136 731					
OWN:LAB SER:ROADS LAB SERV	R114 161					
OWN:P/P:CLEANING SERVICES	R97 300					
OWN:P/P:SAFEGUARD&SECURITY	R67 093					
OWN:RENTAL & HIRING	R3 429 654					
U&A OFST:ADVERTISING & ADMIN COST				R21 779	R0	
U&A OFST:C/P:BUS&ADV SER:PRJ:MAN				R54 000	R0	
U&A OFST:C/P:ENGIN CIVIL		R1 293 461		R1 432 293	R799 145	
U&A OFST:C/P:INF&PLN SER:LN&QT S		R23 270		R142 758	R0	
U&A OFST:CONS ROAD LAB SERVICES		R116 379		R148 585	R282 323	
U&A OFST:CONS:HEALTH & SAFETY				R294 874	R554 243	
U&A OFST:CONTRCTRS:CASUAL LABOUR		R7 048 004		R7 599 466	R4 199 900	
U&A OFST:CONTRCTRS:FIRE FIGHTING		R8 846		R28 290	R0	
U&A OFST:F/SER: REPAIRS		R5 325 671		R2 811 808	R3 053 991	
U&A OFST:INV CLOTH:UNIF&PRT CLTH		R403 821		R589 681	R741 740	
U&A OFST:INV:BLDG&CONSTR MAT		R497 193				
U&A OFST:INV:HARDWARE				R24 000		
U&A OFST:INV:ROAD CONSTR&SUP				R2 476 489	R0	
U&A OFST:INV:ROADS SIGNS				R512 400	R0	
U&A OFST:T&S DOM:ACCOMMODATION		R1 071 370		R1 613 406	R1 158 803	
U&A:OFST:O/P::RENTAL & HIRING				R26 355 037	R25 644 102	
U&A:OFST:O/P:SAFEGUARD&SECURITY				R657 787	R983 616	
PLANT INHOUSE	R4 191 799	R0	R0	R32 211 712	R31 342 792	
PERSONNEL COSTS		R2 825 288		4280739.5	4426611.143	
Grand Total	R24 939 797	R42 242 366		R106 405 009	R101 493 089	R250 140 465
Total expenditure as per DOT supporting docs			R26 098 551	R106 405 009	R96 621 442	R229 125 002

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Table 26: Cofimvaba Asketon cost comparison

Total km under construction	Kilometres completed/ Surfaced	Financial Year Km Completed
50.2km	15km upgrade	3km from 2011/12 – 2014/15 FY
		12km from 2015/16 – 2019/20 FY

For calculation 15km used as completion date Oct 2021 and total is 15km 2016/17 and 2017/18 are excluded as the structures were done in those years

Cost / Km = R16 676 031

Start Date	Completion Date
2011/04/01	2026/03/01

4.4 Outsourced Projects Expenditure Analysis

Table 27: Outsourced Projects Expenditure from BAS

Row Labels	Sum of 2016/2017	Sum of 2017/2018	Sum of 2018/2019	Sum of 2019/2020	Sum of 2020/2021	Sum of Grand Total
DOT SANRAAL MOU/BREIDBACH INTERC					45 583 775	45 583 775
ELITHENI COAL MINE INDWE		56 516 457	102 347 720	40 297 991	9 136 476	208 298 644
HLULEKA ROAD PROJECT PHASE 1	-					0
MLAMLI HOSPITAL ROAD-PH1				0	13 785 824	13 785 824
MLAMLI HOSPITAL ROADS-PH1	-					0
R61:BIZANA TO PT EDWD MGSHN-PH1		146 620 668	0	0	0	146 620 668
R61:BIZANA TO PT EDWD MGSH-PH3&4			0	15 909 911	19 255 929	35 165 840
R61:BIZANA TO PT EDWD(MAGUSHENI-	222 915 355					222 915 355
R61:BIZANA TO PT EDWD(MGSHN-PH1)			39 077 599			39 077 599
R61:BIZANA TO PT EDWD(MGSHN-PH2)	153 443 402					153 443 402
R61:BIZANA TO PT EDWD(MGSHN-PH2)		191 039 673	13 567 499	0	0	204 607 172
R61:BZANA TO PT EDWD MGSHN-PH3&4		0				0
R72 TO HAMBURG			0	18 839 477	19 484 413	38 323 889
SLA ENOCH MGJJI(ZOLA-T/HILL) PH4				25 495 217	28 505 436	54 000 653
SLA:W/VALE 2 DWESA NR V MSEN PH2				17 376 804	160 465 661	177 842 465
SLA:WILLOWALE TO DWESA NR V MSEN		71 386 285	37 152 219	332 103		108 870 607
SLA:WILLOWALETO DWESA NR V MSEN	13 914 361					13 914 361
T125 PH 1 N2 TO SIPHETU HOSPITAL	-					0
T125 PH 3 N2 TO SIPHETU HOSPITAL	-					0
T125 PHASE 1 N2 TO SIPHETU HOSP	2 868 760					2 868 760
T125 PHASE 2 N2 TO SIPHETU HOSP		78 083 931				78 083 931
T125 PHASE 3 N2 TO SIPHETU HOSP	101 190 123					101 190 123
T125 PHASE2. N2 TO SIPHETU HOSP		34 301 221				34 301 221
T125 PHASE4 N2 TO SIPHETU HOSP			16 506 942	4 047 181	44 261 234	64 815 357
Grand Total	494 332 002	577 948 233	208 651 980	122 298 683	340 478 748	1 743 709 646

Table 27 seek to illustrate the expenditure registered over the 5-year period, thus lifted cost drivers on the project intricately discussed and analysed on subsection 0 below. Payment for the construction works is based on monthly interim certificates that in turn is based on a Bill of Quantities (BoQ). Therefore, the BoQ maybe entailed of quite several individual items and monthly payment

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certificates are compiled based on work performed for specific items. Thus, it is easier to make payment against one item that is construction: upgrades & additions or other fix structures to limit the tedious and convoluted paperwork.

4.4.1. Outsourced Projects analysis

Table 28: Outsourced summary items executed

SECTION	Items	ITEM'S SUMMARY OF OUTSOURCE DOT PROJECTS				
		T125 PHASE4 N2 TO SIPHETHU HOSP +/-14km (Scheduled work)	HLULEKA NATURE RESERVE +/-16 km (Scheduled work)	SLA: W/VALE 2 DWESA NR V MSEN PH2 +/-15km (Scheduled work)	MLAMLI HOSPITAL ROAD-PH1 +/-12km (Scheduled work)	DR08005 MAGUSHENI TO MZAMBA (R61) +/-79km (Work value completed)
1.	Preliminary & General	R55 969 533.54	R55 007 680.00	R84 590 962.12	R46 090 940.00	R246 945 591.30
1.1	General Requirements & Provisions	R6 746 250.00	R10 298 250.00	R21 679 423.39	R17 995 000.00	R31 972 469.75
1.2	Contractor's Establishment on Site and General Obligations	R30 167 475.54	R24 593 480.00	R41 319 098.04	R20 620 000.00	R103 331 913.59
1.3	Housing, Offices and Laboratory for The Engineer's Site	R3 423 880.00	R4 803 900.00	R3 961 021.34	R4 871 200.00	R42 202 756.76
1.4	Accommodation Of Traffic	R15 631 928.00	R15 312 050.00	R17 631 419.35	R2 604 740.00	R69 438 451.20
2.	Roadworks	R125 191 812.41	R80 600 720.00	R107 570 097.98	R64 892 633.76	R218 606 851.29
2.1	Overhaul			R7 321 670.00	R1 942 630.50	
2.2	Clearing And Grubbing	R329 848.00	R238 850.00	R769 236.45	452 235.70	R2 334 858.87
2.3	Dayworks	R1 418 431.30	R1 687 600.00	R700 394.00	R1 736 792.50	R372 840.00
2.4	Drains	R9 283 724.00	R2 682 210.00	R5 458 337.30	R1 918 115.00	R6 259 291.20
2.5	Prefabricated Culverts	R4 637 117.50	R1 679 110.00	R6 538 894.97	R4 497 777.40	R7 176 475.50
2.6	Concrete Kerbing, Concrete Channelling, Chutes and Downpipes, And Concrete Linings for Open Drains	R11 370 433.60	R5 133 855.00	R10 327 032.30	R4 159 929.00	R7 063 784.37
2.7	Borrow Materials	R942 500.00		R1 586 654.70	R865 080.00	R2 214 931.08
2.8	Selection, Stockpiling and Breaking Down the Material From Borrow Pits, Cuttings And Existing Pavement Layers, And Placing And Compacting Of The Gravel Mass Earthworks Layers	R20 272 750.00		R28 349 096.00	R4 991 325.00	R67 289 152.70
2.9	Mass Earthworks	R34 259 194.00	R16 481 650.00	R12 790 507.00	R4 401 789.20	R69 306 137.58
2.10	Pavement Layers of Gravel Material	R9 430 550.00	R16 366 000.00	R5 651 766.00	R6 648 300.00	R4 074 630.06
2.11	Stabilization	R3 728 212.86	R4 310 000.00	R3 028 720.00	R6 309 389.67	R13 813 118.90
2.12	Crushed Stone Base	R5 078 900.00	R16 600 000.00	R2 019 035.00	R8 679 000.00	R13 998 494.72
2.13	Breaking Up Existing Pavement Layers					R2 237 138.63
2.14	Prime Coat	R1 055 120.00	R937 404.00	R176 105.00	R1 925 500.00	R520 942.00
2.15	Asphalt Base and Surfacing			R567 332.50	R414 575.00	R12 627 692.26
2.16	Asphalt Base and concrete berms	R441 250.00	R6 625.00			
2.17	Double seals	R3 443 376.50				
2.18	Bituminous single seal with slurry (Cape seal)	R6 778 214.20	R8 060 680.00	R8 113 815.20	R5 311 704.00	
2.22	Guardrails	R1 416 270.00	R163 640.00	R3 555 090.70	R2 521 315.79	R2 494 104.45
2.23	Fencing	R2 194 915.45	R3 168 650.00	R1 758 222.00	R2 136 150.00	R981 342.50
2.24	Road Signs	R1 006 250.00	R227 161.00	R345 093.90	R644 375.00	R476 150.80
2.25	Road Markings	R4 837 075.00	R233 575.00	R754 380.80	R1 101 000.00	R592 947.03
2.26	Landscaping And Planting Plants	R2 750 680.00	R2 278 710.00	R3 189 159.00	R2 125 650.00	R1 813 102.84
2.27	Finishing The Road and Road Reserve and Treating Old Roads	R415 000.00	R240 000.00	R375 555.16	R440 000.00	R223 630.00
2.28	Concrete Pavements				R790 000.00	R2 729 485.80
2.30	Testing Materials and Workmanship	R102 000.00	R105 000.00	R4 194 000.00	R880 000.00	R6 600.00
6.	Occupational Health and Safety	R3 699 635.04	R1 778 150.00		R1 919 000.00	R10 938 706.60
6.1	Occupational Health and Safety	R3 699 635.04	R1 778 150.00		R1 919 000.00	R10 938 706.60
8.	Dev SMME Contr	R17 738 300.00	R9 071 500.00		R3 180 000.00	R7 661 458.16
8.1	Specification For Development For SMME Contractors	R17 738 300.00	R9 071 500.00		R3 180 000.00	R7 661 458.16
9.	HIV/Aids Awareness		R3 000.00			
9.1	HIV/Aids Awareness		R3 000.00			
10.	Value of scheduled works completed/contract awarded	R202 599 280.99	R146 461 050.00	R192 161 060.10	R116 082 573.76	R484 152 607.35
11.1	VAT @ 15%	R30 389 892.15	R21 969 157.50	R28 824 159.02	R17 412 386.06	R72 622 891.10
12.	CONTRACT SUM/ Value of work completed	R232 989 173.14	R168 430 207.50	R220 985 219.12	R133 494 959.82	R556 775 498.45
	Cost per km of Roadworks item	R8 942 272.32	R5 037 545.00	R7 171 339.87	R5 407 719.48	R2 767 175.33
	Total Cost per km (including P's & G's)	R16 642 083.80	R10 526 887.97	R14 732 347.94	R11 124 579.99	R7 047 791.12
	Timeframe in months	27		18		28
	Scope of work	Earthwork, Roadworks, Small labour intensive box culverts,	Earthwork, Roadworks, Small labour intensive box culverts,	Roadworks, Earthwork, Small labour intensive box culverts, Concrete Kerbing, Concrete Channelling, Chutes and Downpipes, And Concrete Linings for	Roadworks, Earthwork, Small labour intensive box culverts, Concrete Kerbing, Concrete Channelling, Chutes and Downpipes, And Concrete Linings for	Earthwork, Roadworks, Small labour intensive box culverts & Gravel Access Roads

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4.4.2. Description and summary of projects outsourced

- SLA: WILLOWALE TO DWESA NR V MSEN & paid under Construction: Upgrade & Additions Other Fix Structures
 - The Department of Transport [DoT] entered into a contractual agreement with Umso Construction [Pty] Ltd for the upgrading of Willowvale Main Street and Internal Bypasses [±7 km] as part of the Willowvale to Dwesa via Msengeni Junction project. For the two financial years 2017/2018 & 2018 /2019 as well as 2019/2020 both, the Contractor and the Consultant paid from Construction: Upgrade & Additions Other Fix Structures SCOA item
 - The commencement date of the contract was the 14 June 2016 with the construction period of 18 months making the original due completion date the 13 December 2017. Due to approved EoT, the revised completion date was the 30 December 2018. The project has been completed.
- T125 PHASE4 N2 TO SIPHETHU HOSP & paid under Construction: Upgrade & Additions Other Fix Structures
 - The Department of Transport [DoT] entered into a contractual agreement with EXR Construction [Pty] Ltd for the upgrading of DR08125 N2 to Siphethu Hospital Ph2 project. For the two financial years 2018/2019 and 2019/2020, both the Contractor and the Consultant paid from Construction: Upgrade & Additions Other Fix Structures from SCOA item.
 - The expenditure for the 2020/2021 is for Phase four (4) of this road for which the Department has appointed Ntungani JV as Contractor. Only the Contractor paid against that item.
 - The commencement date of the contract for Phase 2 was on the 19 April 2015 and the construction period was for 30 months. The due completion date was on the 19 October 2017. Due to approved extensions of time the revised completion date was the 28 February 2018 and project completed.
 - Phase four (4) commenced on the 12 June 2020 with a construction period of 27 months with the due completion date on the 12 September 2022. The project is currently 20% completed

4.4.3. Outsourced services procurement process

- SLA: WILLOWALE TO DWESA NR V MSEN
 - The procurement of the Consultant was through a Service Level Agreement (SLA) between the Department of Roads and Public Works [DRPW] and Mbashe Local Municipality. The original consultant was Sektor Consulting Engineers and preceded by UWP Consulting Engineers [Pty] Ltd. UWP Consulting Engineers [Pty] Ltd subsequently changed their name to MARISWE.

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- The procurement method for construction predominantly an open tender process and differs from that of in-house implemented projects as well.
- T125 PHASE4 N2 TO SIPHETHU HOSP
 - The procurement of the Consultant and Contractor based on an open tender process and tender adjudication process.

5. Performance Analysis

From “TMH 22 Road Asset Management Manual - **PART C: ASSET VALUATION**” – “*In the case of road assets the Current Replacement Cost (CRC) provides a fair and reasonable value of what it would cost to replace the asset based on recent construction cost of similar assets.*”

Unit rates for each component of an asset based on its unit of measure and its cost differentiator. The values used must be aggregated per component type shall be obtained from recent contracts and updated annually in an auditable manner. It is envisaged that the Department of Transport will update unit rates nationally on an annual basis for use in valuations.

*A list of typical unit rates for **2013** is contained in Table C-1 to be used as a guide in drawing up rates for each road authority.”*

Table 29: Current Replacement Cost (CRC) from TMH 22 Road Asset Management Manual

	Unit	CRC Rate (2013)	CRC Rate (2021) 8% Escalation	Rate / m (7m wide road)	
Road Surfacing -Double seal (All sizes) and Single Seal (Mod. Binder)	m2	R60	R102	R714	
Medium Std Mnts Topo	m2	R400	R685	R4 795	
Kerbs including KI's and Grid Inlets	m	R800	R1 371	R1 371	
Road Furniture - Unpaved – Mnts	km	R215 000	R368 500	R369	
Ret Structures Soil Reinforcement – 2 to 4m	m	R4 500	R7 750	R4 650	60%
				R11 899	
P&G estimate	%	15		R13 683	R/m

5.1. Summary of In-house project costs

Table 30: In-house project costs

	Total Cost	Cost / Km	
CANZIBE HOSPITAL ROAD	R129 058 588	R43 019 529 ¹	Excluded

¹ Excluded as this average cost is high as there has been work done on the whole length of the road and not only the 3km completed

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MADWALENI HOSPITAL ROAD	R247 302 762	R19 023 289	
COFFEE BAY/ZITHULELE	R151 220 890	R18 902 611	
COFIMVABA ASKETON	R250 140 465	R16 676 031	
Average		R18 200 644	

The below comments were concluded based on the data analysed on Table 30

- Average cost / km is R18.2 million / km higher than the TMH 22 CRC replacement guideline of R13.6 million / km
- This average cost could be seen as being conservative as the estimates for Inhouse persal and plant costs were using best case scenarios to benefit the department.
- Although the department submitted 7 projects – only 3 were deemed suitable for this analysis. All 3 roads used in the calculation have been in construction from 2016/17 (or before) – which raises efficiency questions (5 years plus); namely: -
 - Should roads with structures (e.g., bridges, large culverts and retaining walls etc.) be constructed in-house?
 - Has the department got the right competency and resources to implement in reasonable timeframes?
 - Even though they are done “in-house” most of the work is completed by outsourced service providers – which cancels the reasoning of “time saving due to procurement extended time frames”.
 - The cost of plant acquisition, depreciation, plant maintenance and personnel fixed costs were not taken into account in the calculation of cost/km. Therefore, it is high likely that average cost/km of R18.2 million is understated.
 - Review of in-house funding model.

5.2. Summary of Outsourced Project Costs

Table 31: Summary of outsourced projects costs

PROJECT AND SCHEDULED WORK	CONTRACT Value of completed	SUM/ work	TOTAL COST PER KM (including P&G's)	
T125 PHASE4 N2 TO SIPHETHU HOSP +-14km (Scheduled work)	R232 989 173		R16 642 084	
HLULEKA NATURE RESERVE +-16 km (Scheduled work)	R168 430 208		R10 526 888	
SLA: W/VALE 2 DWESA NR V MSEN PH2 +-15km (Scheduled work)	R220 985 219		R14 732 348	

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MLAMLI HOSPITAL ROAD-PH1 +- 12km (Scheduled work)	R133 494 960	R11 124 580	
DR08005 MAGUSHENI TO MZAMBA (R61) +-79km (Work value completed)	R556 775 498	R7 047 791	Excluded
Average		R13 256 475	

The below comments were concluded based on the data analysed on Table 31:

- Scope of work comparison Table 8 illustrates scope of work contained on outsourced projects is of bigger magnitude compared to the one executed in-house.
- Number of kilometres completed in a financial year is more
- Average cost / km is R13.2 million / km which is in line with the TMH 22 CRC replacement guideline of R13.6 million / km
- Although the department submitted 9 projects – only 4 were deemed suitable for this analysis. All 4 roads used in the calculation have been in construction for plus minus 2 years – including structures (e.g. bridges, large culverts and retaining walls etc.) which is in stark contrast to those done in-house

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6. Expenditure Observations

Some key elements:-

- Inhouse construction has an allocation of 54km roads upgrades (7 projects to the value of R259million) as to the 95.7km to outsourced (9 projects to the value of R403million)
- The department outsources many of the professional services. The utilisation of inhouse design and contract management capability should be further analysed for effectiveness and efficiencies. This utilisation should also be aligned to what construction works are being implemented inhouse and outsourced.

Inhouse Construction

- Average cost / km is R18.2 million / km higher than the TMH 22 CRC replacement guideline of R13.6 million / km
- This average cost could be seen as being conservative as the estimates for Inhouse persal and plant costs were using best case scenarios to benefit the department.
- Although the department submitted 7 projects – only 3 were deemed suitable for this analysis. All 3 roads used in the calculation have been in construction from 2016/17 (or before) – which raises efficiency questions (5 years plus); namely: -
 - Should roads with structures (e.g., bridges, large culverts and retaining walls etc.) be constructed in-house?
 - Has the department got the right competency and resources to implement in reasonable timeframes?
 - Even though they are done “in-house” most of the work is completed by outsourced service providers – which cancels the reasoning of “time saving due to procurement extended time frames”.

Outsourced Construction

- The scope of work on outsourced projects is of bigger magnitude compared to the ones executed in-house i.e. the inclusion of other road facility amenities like bridges
- Number of kilometres completed in a financial year is more
- Average cost / km is R13.2 million / km which is in line with the TMH 22 CRC replacement guideline of R13.6 million / km
- Although the department submitted 9 projects – only 4 were deemed suitable for this analysis. All 4 roads used in the calculation have been in construction for plus minus 2 years – including structures (e.g. bridges, large culverts and retaining walls etc.) which is in stark contrast to those done in-house

Some of the problems that road infrastructure implementation needs to address in managing the roads infrastructure include:

- *Inappropriate prioritization in allocating budgets:* Prioritization of new infrastructure happens at the expense of maintaining existing assets.

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- *Maintenance budgets:* These are often treated as discretionary budget line items and are the first to be cut to realize savings. The department need to be constantly investing in the refurbishment of their infrastructure and ensuring that aging assets are upgraded timeously.
- *Lack of asset lifecycle planning capability:* Maintenance of roads infrastructure is mainly done on an ad- hoc basis as there is no proper base for planning and budgeting for planned maintenance of infrastructure.

Current funding available for roads infrastructure is insufficient for meeting existing maintenance and rehabilitation requirements in the sector. There is therefore a need for reprioritization on budgets to effectively deal with its core services and manage competing needs. To strike a balance remains a critical challenge for most as there is always a gap between conditions on the ground and the community priorities.

If improvements to the existing roads infrastructure are not tackled in a robust way, either by increasing budget allocations, and sound integration between provincial departments and other roads authorities (National DoT & SANRAL), municipalities will be faced with increasing backlogs which will further compromise general service delivery and undermine economic growth.

Furthermore, there should be an increase in investments in storm water channels, to mitigate flooding and the associated damage. There must be sound decision-making relating to investment in and maintenance of road infrastructure.

The main conclusion from this study is that while lenders and national road agencies will clearly benefit from having a better understanding of unit costs and related issues, a more permanent road unit cost database should be established, which can then be analyzed on a continuous systematic basis.

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7. Options

Based on the recommendations made on section 8 below, there might be a need to mix the outsourced or inhouse model during the implementation of infrastructure, for both models to complement each other on the same projects, to limit the risk if not mixed. This could bridge the gap between the projects that are identified to be outsourced or inhouse. However, inasmuch the recommendation would probably start to bring convergency between the two models, but a clear assessment needs to be conducted to be able lift which items are more appropriate to be executed by which model.

8. Recommendations

Current funding available for roads and storm water infrastructure is insufficient for meeting existing maintenance and rehabilitation requirements in the sector. There is therefore a need for better prioritization on available budgets to effectively deal with its core services and manage competing needs.

If improvements to the existing roads infrastructure are not tackled in a robust way, by increasing budget allocations the department will be faced with increasing backlogs which will further compromise general service delivery and undermine economic growth.

Key recommendations are: -

- i. In-house construction takes longer and is more expensive – thus they should focus on smaller gravel upgrade projects with no structures involved.
- ii. Even though it is deemed to be In-house construction – many of the components if the project need procurement and are thus outsourced. The department should review its resources to ensure effectiveness of deploying its own resources to ensure that public resources are maximised
- iii. In-house plant needs a detailed analysis to ensure its utilisation is efficient and not wasted – this should be one of the determining factors on which roads are allocated for in-house construction.
- iv. If need persist to implement the in-house, the section needs to be highly resourced on personnel to meet up with the demand.
- v. Outsourced need also to be closely monitored as there are wastages observed, probably the need for personnel resourcing is a need as the unit also underperformed on the last financial year end (20/21)
- vi. There should be a review of a model utilizing a combination of the two models to complement each other and limit the risk.

The main conclusion from this study is that the department will clearly benefit from having a better understanding of unit costs and related issues to in-house versus outsourced construction, a more

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permanent road unit cost database should be established, which can then be analyzed on a systematic basis.

9. Actions

The department

- Will clearly benefit from having a better understanding of unit costs and related issues to in-house versus outsourced construction, a more permanent road unit cost database should be established, which can then be analyzed on a systematic basis.
- Should implement a full review on which scope of works benefits their inhouse construction capability for efficiency and effectiveness – all other work should be outsourced. This model is also dependant on the department's plant and equipment strategy.
- Should review inhouse and outsourced professional service areas that suit their implementation model – this should include a review of a model utilizing a combination of the two models to complement each other and limit the risk

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10. Appendices

10.1. Logframe

IMPACT	Maximising the contribution of transport to the economic and social development goals of the society by providing fully intergrated transport operation and infrastructure			
OUTCOME	Improved provincial Transport Infrastructure.			
Outputs	Construction of roads and related facilities		Well maintained roads assets as per defined standards	
	Outsourced construction of roads and related facilities	In-house construction of roads and related facilities		
Intermediate Outputs	Tender documentation & project design	Internal capacitation & training, maintained plant & equipment	Internal capacitation & training, maintained plant & equipment	Internal capacitation & training, maintained plant & equipment
Activity		In-house plant and equipment procuring and repairs	Monthly reporting	Monthly reporting
Activity	Monthly reporting, progress payments and site meetings by internal human capital and outsourced personnel	Monthly reporting, payments of suppliers	Transporting plant & equipment	Maintain road reserves, clear drainage and vegetation
Activity	Issue job instructions to contractors appointed, professional services monitoring and,	inhouse supervision and management	Maintain road reserves, clear drainage and vegetation	Patching, reseal surfaced roads and pothole repairs
Activity	Implement outsourced gravel road upgrades, lane added to existing surfaced roads & construct new roads	Implement inhouse gravel road upgrades, lane added to existing surfaced roads & construct new roads	Replace road sign faces	Replace road sign faces, maintain ancillary components & renew road markings
Activity	Advertise tender, prepare tender documentation, adjudicate tenders received & award	Plant servicing & equipment calibration	Regravel gravel roads	Rehabilitate/repair bridges & culverts
Activity	Review and approve initial conceptual project design and costing	Costing and budget allocations internally	Plant servicing & equipment calibration	Plant servicing & equipment calibration
Activity	Identification the need for construction of the road network and related facilities,	Identification the need for construction of the road network and related facilities,	Identification of the need for maintenance of the road network and related facilities,	Identification of the need for maintenance of the road network and related facilities,
Input	Outsourced Material, plant and equipment	Material, plant and equipment	Materials, plant and equipment	Materials, plant and equipment
Input	outsourced construction services	Internal construction personnel,	Internal maintainance personnel,	Internal maintainance personnel,
Input	Internal Project management & supply chain personnel	Internal construction, Project management & supply chain personnel	Internal technical & supply chain personnel	Internal technical & supply chain personnel
Input	Internal & external planning personnel, external design engineers and internal engineers, Visual Condition Indices (VCIs), TRH 22 and softwares (Civil designer, Microsoft projects, Zoho)	Internal planning personnel and internal engineers, Visual Condition Indices (VCIs), TRH 22 RAMP and softwares (Civil designer, Microsoft projects, Zoho)	Internal data and archived information (Visual Condition Indices (VCIs), TRH 22 & RAMP	Internal data and archived information(Visual Condition Indices (VCIs), TRH 22 & RAMP
Input	Planning & Budget allocation (Equitable share)	Planning & Budget allocation (Equitable share)	Planning & Budget allocation (Equitable share & PRMG)	Planning & Budget allocation (Equitable share & PRMG)
Programme elements	Designing & Constructing of Surfaced Roads	Constructing of Surfaced Roads	Rehabilitating gravel roads	Rehabilitating and Resealing of Surfaced Road
Responsible units within the department or agency	CD:Construction, DIR Outsource Construction,	DIR In-House Construction	CD:Maintenance	CD:Maintenance

Figure 5: Logframe

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10.2. Organograms / structure

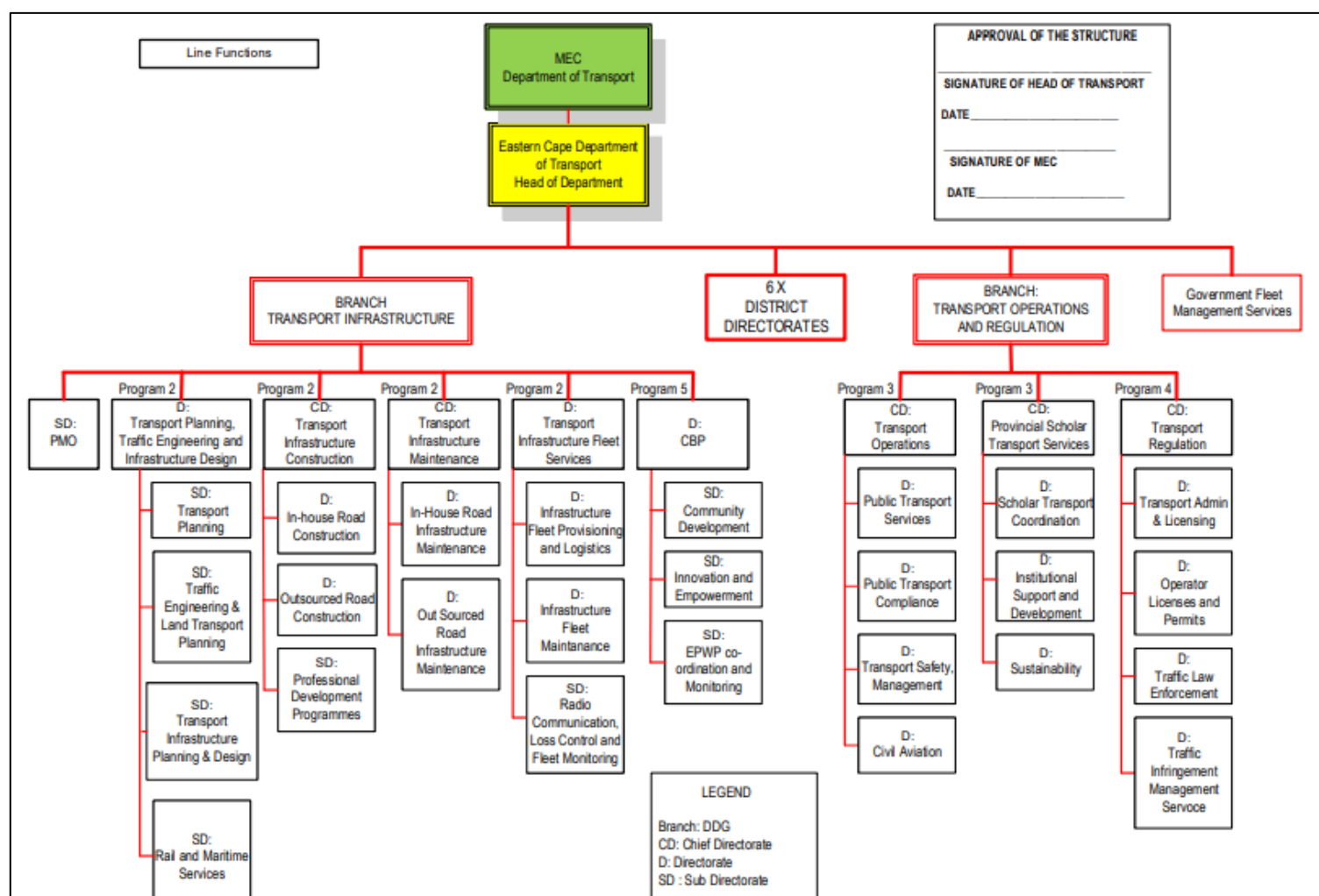


Figure 6: Departmental Organogram

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