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# Breaking the regravelling trap: A fiscal-federalism contract for upgrading South Africa's unpaved roads

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## Abstract

South Africa's provincial and municipal road networks are dominated by low-volume gravel roads that are essential for service delivery and market access but are chronically under-upgraded. This paper argues that the persistence of repeated regravelling, reactive repairs, and post-disaster reinstatement is not primarily an engineering failure; it is an intergovernmental public investment problem. Responsibilities are decentralised across multiple principals and agents, benefits from upgrading are partly non-excludable and spill across jurisdictions, and budget holders face short-horizon fiscal constraints. The resulting wedge between national welfare and sub-national private incentives generates an underinvestment equilibrium in which economically justified upgrades are deferred and recurrent maintenance liabilities compound.

The paper's core contribution is the design of an implementable financing reform: an Unpaved Roads Upgrade Facility (URUF). URUF is a conditional, multi-year capital instrument that finances upgrading priority unpaved roads to low-volume sealed road standards while hard-wiring maintenance performance and minimum service levels into the financing contract. It is designed to operate within South Africa's existing public financial management architecture, aligning with infrastructure stage-gate controls and procurement standards, and using established enforcement levers (withholding, stopping and reallocation) to harden budget constraints and reward durable delivery. Project selection follows a published prioritisation schedule that protects constitutional access needs and maximises support for industrial activity.

A compact fiscal-dividend accounting framework is outlined to show why the national fiscus should sensibly fund the capital outlay. National Treasury internalises a disproportionate share of returns through higher tax revenues from increased economic activity and labour mobility, reduced expected maintenance and rehabilitation liabilities, and lower contingent disaster-response costs as resilience improves. The paper concludes with a practical implementation pathway - combining staged disbursement-linked indicators, independent verification, standardised designs, and targeted delivery support - intended to shift South Africa from ad hoc upgrading toward a predictable, rules-based mechanism that expands reliable rural access while reducing medium-term fiscal and climate-related road liabilities.

**Keywords:** Public investment management; Intergovernmental fiscal relations; Conditional grants; Performance-based financing; Low-volume sealed roads

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# EXECUTIVE SUMMARY

This paper's central claim is that persistent under-investment in upgrading priority unpaved roads to low-volume sealed road (LVSR) standards is not primarily an engineering problem. It is a predictable equilibrium outcome of South Africa's intergovernmental system for roads financing, where (i) responsibilities are fragmented across multiple principals and agents, (ii) fiscal resources are contested in a common-pool environment, (iii) budgeting horizons are short relative to asset lives, and (iv) the benefits of reliable access roads are partly non-excludable and spill across jurisdictions. Together, these features generate a structural wedge between what is economically efficient for the country and what is privately optimal for the sub-national budget holder (Berry, 2008; Jordahl, 2006; Kornai, 1986; IMF, 2019).

## The decentralised decision problem

Against a social planner benchmark, the upgrade of an unpaved road to a LVSR is justified if the present value of total benefits exceeds the present value of total costs over the asset life. Benefits are multi-channel and only partly captured by the marginal road user. They include: travel time and vehicle operating cost savings; improved year-round serviceability and reliability for public services; reduced disruption to local supply chains; and - critically for the national fiscus - higher economic activity and associated tax receipts, alongside lower expected liabilities from repeated regravelling cycles and disaster-related repair claims.

But in practice, the relevant decision maker is rarely a unitary social planner. It is typically a provincial department, a roads authority, or a municipality operating within a fragmented governance environment. Under decentralisation, the implementing authority's objective function is narrower and its constraints tighter:

1. **Multi-principal / multi-agent governance weakens accountability and dilutes incentives.**

When multiple principals (national departments, treasuries, political executives, oversight bodies) and multiple agents (provincial and municipal implementers, contractors, delegated agencies) jointly influence the road programme, accountability for life-cycle outcomes becomes blurred. This makes it rational - particularly under capacity constraints - to favour actions that are "budgetable" and observable within a short reporting window (e.g. reactive repairs and routine grading) over lumpy, multi-year upgrades that require disciplined preparation, procurement, and post-completion preservation.

2. **Common-pool pressures and "law of 1/n" dynamics distort project choice and effort**

In multi-level systems, local jurisdictions often face incentives to pursue projects whose local political benefits are concentrated while costs are partially externalised (through shared national resources, expected bailouts, or future grant adjustments). Classic common-pool models show that when decision makers internalise only a fraction of the financing cost, they tend to select projects and spending paths that are inefficient from an aggregate welfare perspective (Jordahl, 2006). In roads, the distortion can present not only as overspending in some categories, but also as under-investment in preventive, life-cycle efficient interventions if the costs of deferred action can be shifted to future budgets or higher spheres of government.

3. **Short-horizon budgeting creates a structural bias against upgrading.**

LVSR upgrades have high up-front capital outlays and benefits that accrue over long horizons (often 10–20 years), while the political and budget cycle is annual and medium-term at best. This creates a time-inconsistency problem: even if an upgrade has a strong life-cycle case, it competes against other immediate pressures within constrained capital ceilings, and its benefits may not be fully realised (or credited) within

the current decision maker's tenure. Public investment diagnostics consistently identify weaknesses in multi-year budgeting, maintenance funding, and portfolio oversight as core drivers of low infrastructure quality and low value for money - precisely the failure mode observed in access road networks (IMF, 2019).

4. **Non-excludable spillovers imply systematic under-provision under "user-pay" financing.**

Many benefits of basic access roads are non-excludable (e.g. network connectivity, service delivery reliability, resilience), and a pure user-pay approach is both administratively costly and likely to ration essential access. Standard public economics implies that where benefits are diffuse and non-excludable, relying on direct charges will under-provide the socially efficient level of investment; efficient financing therefore requires a substantial general-revenue component and a mechanism to pool resources at the level where spillovers are internalised (IMF, 2019).

5. **Soft budget constraints encourage reactive repair equilibria and weaken upgrading effort.**

Where sub-national actors anticipate that severe deterioration or disaster damage will trigger discretionary transfers, emergency allocations, or political interventions, budget constraints become "soft": poor outcomes are partially insured by higher spheres of government. Soft budget constraint theory predicts moral hazard: weaker incentives to preserve assets proactively and a tendency to defer hard choices, because the adverse tail risks are expected to be socialised (Kornai, 1986). In the roads context, this pushes behaviour toward recurrent regravelling and post-event reconstruction rather than investing in resilient, lower life-cycle cost standards.

Combining these elements yields an under-investment equilibrium that is straightforward to describe:

- Benefits are long-horizon and partly external (spillovers, fiscal dividends, resilience)
- Costs are immediate and borne by constrained sub-national budgets
- Governance is fragmented and accountability for life-cycle outcomes is weak
- Reactive spending is politically and administratively easier than disciplined upgrading
- Expected bailouts/emergency support soften the penalty for deferring action

In equilibrium, too many priority gravel roads remain in a cycle of grading, regravelling, and periodic damage repairs - even where upgrading would reduce the present value of public liabilities and improve service reliability.

## URUF as an institutional contract that changes constraints and incentives

The Unpaved Roads Upgrade Facility (URUF) is presented in this paper as a mechanism to shift the system from this equilibrium by creating a credible intergovernmental contract - one that (i) places the capital financing burden at the level that internalises the largest share of benefits (national fiscus), and (ii) hard-wires enforceable delivery and preservation obligations into the financing arrangement. URUF changes the system through five contract provisions:

1. **Internalisation of spillovers by aligning payer and beneficiary.**

By funding the high capital outlay through a national instrument, URUF allows National Treasury to internalise the national tax-base gains, the reduction in expected future liabilities from repeated maintenance and disaster claims, and the macro-reliability benefits that sub-national agencies cannot fully capture. This directly targets the core fiscal externality and reduces the wedge between national welfare and sub-national incentives.

2. **A hard budget constraint with enforceable remedies.**

URUF should be implemented through a conditional grant framework with explicit withholding, stopping, and reallocation remedies. These remedies transform the soft budget constraint into a harder one: performance failures have predictable consequences, and persistent under-performance does not simply roll forward indefinitely (Division of Revenue Act, 2024).

3. **Multi-year commitment structure that lengthens horizons without losing control.**

URUF provides a rules-based, multi-year pipeline and predictable tranche disbursements, reducing the annual "start–stop" problem and enabling implementers to plan procurement, build capacity, and deliver at scale. Public investment management evidence emphasises that credible multi-year budgeting and portfolio oversight are essential to raising infrastructure value for money; URUF operationalises that lesson within South Africa's budget institutions rather than requiring constitutional or legislative redesign.

4. **Stage-gate disbursement and independent verification to address principal–agent problems.**

URUF disburses against a small number of verifiable deliverables (readiness/appraisal, construction completion, and post-completion condition outcomes) aligned to South Africa's infrastructure control framework and procurement standards. Stage-gates reduce information asymmetry and limit the ability to trade off road surface quality for short-term expenditure performance (National Treasury, 2015; National Treasury, 2019).

5. **Maintenance covenants and anti-substitution rules limit moral hazard and fiscal displacement.**

URUF must explicitly prevent substitution of national funds for baseline maintenance and preservation. A maintenance covenant (funded routine preservation plans for upgraded links) and anti-substitution rules (no offsetting reductions in own-budget maintenance allocations for the rest of the network) ensure that URUF buys a genuine shift to a lower life-cycle cost pathway rather than merely financing "more projects" without preservation. These rules make URUF a mechanism for liability management, not just capital expansion.

URUF is not presented as a generic funding increase. It is a targeted institutional response to a well-understood fiscal federalism and public investment governance problem: it reallocates financing responsibility to the level that captures the largest share of benefits and introduces a credible performance contract that hardens budget constraints, lengthens planning horizons, and enforces life-cycle outcomes.

# 1. Introduction

South Africa's road network is large, predominantly low-volume, and overwhelmingly managed outside the national sphere. These features matter because the economic case for upgrading unpaved roads to low-volume sealed roads (LVSR) is often strongest precisely where conventional financing logics perform worst: traffic volumes are too low to support proportionate user-charging, benefits are partly non-excludable and spill across jurisdictions, and the fiscal space and delivery capability required to execute multi-year capital programmes is uneven across sub-national authorities. In this setting, the predictable result is an inefficient equilibrium: repeated regravelling and reactive repairs dominate, while economically justified upgrades are deferred, even where life-cycle costs and climate exposure imply that sealing is the least-cost pathway over time.

The policy problem addressed in this paper is therefore not primarily technical (i.e. whether it is cost-effective to seal low-volume roads), but institutional: how to finance and deliver a portfolio of upgrades in a way that is (i) economically defensible, (ii) administratively feasible, and (iii) incentive-compatible across spheres of government. Evidence from South Africa's infrastructure assessments and expenditure reviews points to material backlogs and persisting surface condition weakness on sub-national roads, with associated user costs and service-delivery risks. At the same time, South Africa already has a comparatively mature public financial management and procurement architecture for infrastructure delivery, which provides stage-gates, standardised controls and enforceable delivery disciplines that can be leveraged rather than reinvented.

This paper's core proposition is that upgrading priority unpaved roads should be treated as national liability management, not as a discretionary sub-national add-on. The capital outlay required to shift selected corridors from recurrent regravelling to low-volume sealed standards is material, but the fiscal and economic returns accrue significantly to the national sphere. The National Treasury is structurally better positioned than provinces and municipalities to carry multi-year capital commitments because it: (i) captures a substantial share of any incremental tax base generated by improved market access and labour mobility (through VAT, personal income tax and corporate income tax); (ii) can reduce future recurrent maintenance liabilities indirectly financed through the intergovernmental system (including where poor asset preservation drives upward pressure on conditional grant demands); (iii) can reduce the frequency and scale of emergency fiscal responses to flood and storm damage as climate risks intensify; and (iv) can crowd in employment-intensive delivery models that raise short-term labour demand (particularly for low-skilled workers), thereby easing pressure on household distress and, at the margin, social assistance dependence. The logic that infrastructure resilience and disaster risk represent rising contingent liabilities for the fiscus is explicitly recognised in national disaster risk financing policy.

International precedent reinforces both the economic rationale and the feasibility of results-linked public financing for unpaved roads. Large rural roads programmes have been centrally financed (or centrally enabled) precisely because local benefits spill over into national growth and fiscal outcomes; India's PMGSY is a prominent example, and rigorous evidence shows that rural road access can shift labour allocation and expand non-farm work - mechanisms that are directly relevant to South Africa's rural labour markets, spatial inequality, and demand for investment in human capital. Separately, results-linked public financing instruments - most notably the World Bank's (2025a) Program-for-Results (PforR), which disburses against verifiable results using country systems - demonstrate that stage-gated, output-verified funding can be implemented without constructing entirely new institutions, provided indicators are few, auditable and tied to a clear programme logic.

Against this backdrop, the paper develops a practical financing reform: an Unpaved Roads Upgrade Facility (URUF) - a conditional, multi-year capital instrument that finances upgrading priority unpaved roads, while hard-wiring maintenance performance and service levels into the financing contract. In most cases the

relevant upgrade option is a low-volume sealed road (LVSR) standard, but the facility should also allow strengthened gravel or alternative surfacing options where these are the appropriate and lifecycle-cost-effective response. The facility is designed to operate within South Africa's existing infrastructure control framework, using stage-gates, standard templates, and enforceable remedies for under-performance. In essence, URUF converts what is currently a politically exposed, stop-start set of projects into a predictable, rules-based pathway: (i) projects are selected on transparent cost-effectiveness and service criteria; (ii) funds are released only against verified readiness and delivery milestones; and (iii) post-upgrade road condition outcomes determine retention release and future access to tranches.

The contribution of the paper is threefold:

- First, it reframes sub-national unpaved road upgrading as a fiscal federalism and liability management problem: where benefits spill over and fiscal capacity is asymmetric, a primarily national financing solution is efficient even when delivery remains decentralised.
- Second, it proposes an implementable institutional design (URUF) that is consistent with South Africa's binding public finance and procurement disciplines, rather than relying on idealised institutional capacity.
- Third, it sets out a feasible enforcement-and-support package that recognises heterogeneous sub-national capability: standardisation, pooled procurement options, targeted technical assistance, and credible stop/reallocation provisions.

The remainder of the paper is structured as follows. Section 2 summarises the structure of South Africa's road network and the institutional assignment of functions across spheres. Section 3 motivates why many unpaved road upgrades generate benefits that are not fully captured by marginal users and why this undermines purely user-pay financing on low-volume links. Section 4 sets out the binding delivery and incentive constraints in the current system (budgeting, procurement, and maintenance preservation) and highlights why more funding without redesign is unlikely to shift outcomes. Section 5 presents the URUF mechanism in detail, including the funding logic for a National Treasury-led capital envelope, the stage-gate disbursement model, and the performance and maintenance covenants required to protect life-cycle value. Section 6 proposes an aligned delivery strategy - particularly around capacity, contractor development, and procurement routes - that makes the mechanism operational at scale. Section 7 concludes with the key policy implications and a prioritised implementation pathway.

# 2. Characteristics of the South African road network

## 2.1 Institutional overview

South Africa's public road network is governed through a decentralised assignment of functions across the national, provincial and municipal spheres. In practice, this creates a multi-principal, multi-agent environment: different road authorities are responsible for planning, financing, construction, maintenance and rehabilitation within legally proclaimed portfolios (including SANRAL, provincial departments, metropolitan municipalities and district municipalities), while the national Department of Transport primarily performs facilitative and regulatory functions. This institutional fragmentation matters economically because it weakens the link between (i) the returns to upgrading low-volume roads (many of which accrue to road users and the national and regional economies over long horizons) and (ii) the budget holders who must commit scarce capital funds today. In fiscal federalism terms, the arrangement is prone to common-pool pressures and vertical fiscal imbalance dynamics that tilt spending towards short-horizon, visible and administratively "easier" expenditures rather than lumpy, multi-year upgrading.

## 2.2 Road network composition

South Africa's road network is large by international standards and, crucially for this paper, highly skewed towards unpaved roads. The DoT (2025) reports a total network of approximately 750 000 km, inclusive of unproclaimed roads. As shown by the inventory in Table 1, about 158 124 km (21.08%) of the road network is paved, while the majority of about 591 876 km (78.92%) is unpaved.[4] The responsibility for gravel roads is essentially equally shared by provincial and municipal authorities. Provinces manage about 226 273 km of unpaved roads, which is 82.69% of the road network under their ownership and 38.23% of the total gravel road network. Municipalities manage about 219 223 km of unpaved roads, which is 85.33% of the road network under their ownership and 37.04% of the total gravel road network. Metros manage about 14 461km (just 2.44%) of the gravel road network, and about 131 919 km (22.29%) of the gravel road network is unproclaimed.

Undeclared roads are heterogeneous with respect to origin and functions for their users. Some were built by apartheid-era administrators in so-called "locations" for workers near towns and were not the responsibility of local municipalities. Such roads that were officially declared can possibly be identified from original plans and later additions. However, condition reports on such roads will be missing. There are spines in most of these networks where public transport can operate and because of the low vehicle ownership, these spines are within easy reach of pedestrians. In general, upgrades to them should include provision of pedestrian walkways. Most undeclared roads are to be found in the former 'homelands' or in recent informal settlements elsewhere, where people have migrated from rural areas to dense settlements near access roads or closer to economic hubs. For example, along large sections of the N2 in the Eastern Cape one finds large informal settlements on either side, most of which consist of hundreds or thousands of dwellings erected before roads or other services were provided. Many of these roads, for which condition reports will not exist, will be classified as basic access roads once identified, and will consequently be prioritised for upgrades. The need for once-off allocation of finance to conduct a large-scale identification project has been recurrently noted by economists for the past twenty-five years.

*Table 1: Overview of the South African road network*

| Authority | Network length (km) | | |
|---|---|---|---|
| | Paved | Gravel | Total |
| SANRAL | 21 403 | 0 | 21 403 |
| Provinces (9) | 47 348 | 226 273 | 273 621 |
| Metros (8) | 51 682 | 14 461 | 66 143 |
| Municipalities | 37 691 | 219 223 | 256 914 |
| Total | 158 124 | 459 957 | 618 081 |
| Un-proclaimed (estimate) | 0 | 131 919 | 131 919 |
| Estimated total | **158 124** | **591 876** | **750 000** |

Source: (Department of Transport, 2025)

This composition matters because it creates a structural lifecycle-cost problem. Unpaved roads are inherently maintenance-intensive (grading, regravelling, and drainage upkeep) and exhibit faster serviceability loss under traffic growth, rainfall, and pressure from heavy vehicles. In a fiscally constrained environment, a large unpaved portfolio therefore increases the probability of a "maintenance trap": scarce budgets are absorbed by short-horizon recurrent works required simply to keep roads passable, while economically efficient capital deepening (upgrading to sealed standard) is postponed. This is the central "second-best" setting of the paper:

[4] Unpaved Roads are defined in the *TRH24* as "(unsurfaced roads) any road not provided with a permanent all-weather surface. Unpaved roads include earth- and sand tracks, engineered natural surfaced (ENS) roads or earth graded roads and engineered gravel surfaced (EGS) roads, often referred to as gravel roads."

even when the project-level economic case for sealing is strong, system-level incentives and constraints can prevent efficient reinvestment in the asset base.

The institutional distribution of the network reinforces the delivery challenge. National roads are a small share of total network length (on the order of 3–4 per cent of the proclaimed network) but support a disproportionately large share of the economic activity serviced by the road system. SANRAL (2021) reports that national roads carry about 34.9 per cent of all vehicle kilometres travelled and more than 70 per cent of long-distance road freight. Correspondingly, the national network is generally maintained to a higher standard: SAICE (2022) grades national roads B+, noting a low proportion in poor and very poor condition. By contrast, SAICE grades provincial and municipal unpaved roads at E, and paved provincial/urban roads at D, pointing to weak asset management, reactive maintenance, and chronic underfunding.[5] These contrasts are not merely descriptive; they indicate where the binding constraints are likely to sit when upgrading of economically eligible gravel links does not occur at scale – namely, in the provincial and municipal spaces where most unpaved roads are located.

A related but distinct issue is the rehabilitation backlog on poorly maintained paved provincial and municipal roads. These roads are not the focus of this paper because they do not present the same treatment-choice problem as unpaved roads: the required intervention is generally rehabilitation, reconstruction or resurfacing according to established road asset management systems, rather than a decision about whether and when to shift from gravel maintenance to a sealed standard. They should therefore continue to be prioritised through existing asset-management processes and funded through established streams such as the Provincial Roads Maintenance Grant, municipal own revenues and other conventional rehabilitation allocations.

## 2.3 The rate of unpaved road upgrades

A central empirical fact motivating this paper is that the rate at which gravel roads are converted to a sealed standard is extremely low relative to (i) the size of the gravel network and (ii) the volume of maintenance applied to keeping that network serviceable. National Treasury's (2021; 2025) Provincial Budgets and Expenditure Review (PBER) reports that provinces upgraded 485 km of gravel roads to surfaced roads in 2017/18, 277 km in 2018/19, 148 km in 2022/23, and 166 km in 2023/24. In contrast, in the same PBER reporting, provinces re-gravelled 4,035 km (2017/18), 2,566 km (2018/19), 4,674 km (2022/23) and 5,279 km (2023/24).

Two implications follow from this situation. First, the system is operating on a maintenance-heavy, upgrade-light production mix. Using the four-year averages from the same PBER outputs, provinces upgraded approximately 270 km per year while re-gravelling approximately 4 140 km per year – this equates to around 15 km of re-gravelling for every 1 km upgraded.

Second, the pattern is indicative of a financing wedge rather than a failure of road appraisal logic. The paper's premise is not that all gravel roads should be sealed, but rather, following analysis in Townshend (2019) and Ross and Townshend (2019), that gravel roads worth maintaining - particularly where traffic volumes are high – satisfy the standard lifecycle decision rule to justify their upgrade: the sealed alternative can deliver

[5] "D: At risk of failure. Infrastructure is not coping with normal demand and is poorly maintained. It is likely that the public will be subjected to severe inconvenience and even danger without prompt action." (SAICE, 2022)

lower discounted agency costs (internalising expected road user costs) over the evaluation period. TRH24[6] notes that road departments have historically applied an HDM-4-derived screening guideline that unpaved roads should be upgraded once Annual Average Daily Traffic (AADT) exceeds 200, but that this is not generally achieved largely due to budget constraints, with upgrades often only occurring once AADT exceeds 500–1 000 vehicles (SANRAL, 2025). Persistently low upgrade rates in the presence of ongoing, repeated maintenance expenditure therefore point to binding constraints in the public finance and delivery system - i.e. capital rationing, weak capital budgeting/procurement throughput, and/or grant and budget structures that favour recurrent maintenance outputs over economically efficient upgrading.

TRH24 further helps to contextualise where the relevant upgrading pressure is likely to sit in the network. For the subset of unpaved rural roads for which traffic data are available (AADT recorded for 66 019 km), 32.7% have AADT below 100, 54.3% are between 100 and 299, and 13.1% are above 300 vehicles (SANRAL, 2025). Importantly, TRH24 also reports that only 22 890 km (9.7%) of the unpaved rural road network is in good or very good condition, and that - because Road Asset Management Systems (RAMS) typically prioritise higher-volume links - roads in good and very good condition are disproportionately concentrated among higher-traffic roads (AADT > 300). This reinforces the interpretation that the most defensible upgrade candidates are not marginal, ultra-low-volume tracks, but rather segments that already carry meaningful traffic, attract maintenance prioritisation, and are likely to yield material lifecycle and user-cost gains from sealing - yet remain trapped in a re-gravelling equilibrium due to financing and procurement constraints.

## 3. The rationale of a programme to seal unpaved roads

Upgrading unpaved roads to LVSR standards is best understood as an intertemporal asset-management decision: it trades a higher upfront capital outlay for a different time path of costs and serviceability. TRH24 emphasises that this comparison should be undertaken using lifecycle cost analysis (LCCA) framed as a present-worth-of-costs (PWOC) problem, where all relevant future cost streams are discounted to the present and the option that delivers the required level of service at the lowest expected PWOC is selected (Committee of Transport Officials, 2024). In this context, TRH24 places particular emphasis on the role of performance-based specifications and "third-millennium" modified/emulsion-related technologies (especially nano-modified emulsions (NME)) as they can materially shift the cost and durability frontier for low-volume roads. The economic relevance is straightforward: by enabling the use of locally available materials while improving moisture resistance and layer performance, these approaches can reduce the upfront cost of achieving an all-weather standard and/or extend effective service life, thereby reducing the expected frequency and cost of periodic interventions (Committee of Transport Officials, 2024). Where this is achieved, the break-even point at which sealing dominates a "maintain-as-gravel" strategy in lifecycle cost terms will occur earlier (and at lower traffic volumes) than under traditional, higher-cost designs.

Within the PWOC framework, the main logic for sealing does not rest on advocacy but on the structure of long-run costs. Unpaved roads embed recurring periodic maintenance liabilities (most notably regravelling) whose required frequency rises with traffic and environmental exposure. LVSR options replace that maintenance profile with an upfront surfacing investment and a lower-frequency schedule of periodic

[6] TRH24 is the official manual published by SANRAL covering the guidelines for most major aspects regarding the upgrading of unpaved roads. These include economic evaluations and warrants, geometric design, drainage design, road pavement structure evaluation and design, surfacing design, recommended procurement procedures and proposed future maintenance actions. The emphasis is on the application of applicable and appropriate standards and the optimum use of Naturally Available Granular Materials (NAGMs). The latter is achieved through the incorporation of scientifically proven Material Compatible New (Nano) Modified Emulsions (MC-NME) technologies, which enables NAGMs to be utilised in all road pavement layers. These technologies are also ideally suitable for the improved labour-intensive maintenance of roads. Many of the recommendations incorporated into the TRH24 not only applies to lower order roads but are also applicable to higher order roads.

treatments (reseals and, where applicable, rejuvenation), supported by routine maintenance. TRH24 sets out the required cost components for a proper LCCA comparison, including initial upgrading costs, routine and periodic maintenance, future capital costs and salvage value (and, where appropriate, selected user and economic costs when levels of service diverge) (Committee of Transport Officials, 2024). TRH24 also provides indicative unit costs for LVSR surfacing options and key maintenance activities, which illustrate why recurrent gravel renewals can dominate the long-run cost profile even when the initial surfacing cost is higher (Committee of Transport Officials, 2024).

On this basis, TRH24 reports LCCA simulations that provide an evidence base for systematic prioritisation. The results confirm that LVSR alternatives are, in most instances, cost-effective substitutes for maintained gravel roads at moderate traffic volumes, with the implication that the efficient policy threshold for upgrading can be well below the levels at which upgrading is commonly observed in practice (Committee of Transport Officials, 2024). This conclusion is supported by research by Townshend (2019), Ross and Townshend (2017; 2019a), The World Bank (2023), and the Development Bank of Southern Africa (2025). The TRH24 simulations indicate that LVSR alternatives typically become preferable to a maintained gravel strategy at roughly 150–180 vehicles per day, and that once AADT exceeds 200 vehicles per day, most LVSR options (excluding thicker asphalt overlay) are more cost-effective than continued gravel maintenance in lifecycle cost terms (Committee of Transport Officials, 2024).

The implication for this paper is therefore narrow and operational: TRH24 provides a credible lifecycle evidence base confirming that upgrading a material subset of unpaved roads is economically coherent when assessed over the asset life (Committee of Transport Officials, 2024). If such upgrading is not occurring at scale, the binding constraint is unlikely to be the absence of technical justification; it is more plausibly located in the financing architecture (budget formation, grant design, and intergovernmental incentives) and procurement system required to convert funding into delivered, quality-assured upgrades.

It is important to emphasise that this argument does not imply an immediate “seal all” prescription, nor does it suggest that ordinary gravel road asset management should be suspended while roads await upgrade. Capital and delivery capacity constraints mean that many gravel roads that warrant sealing on lifecycle-cost grounds will remain gravel roads for several budget cycles. These assets should not be allowed to collapse while they sit in the upgrade queue. Where a gravel road remains in fair or good condition, the appropriate interim strategy is continued preservation under the relevant road asset management system: routine grading, drainage upkeep, spot repairs and condition-triggered regravelling until its priority ranking and available capital justify conversion to LVSR standard. By contrast, where a gravel road has deteriorated to poor or worse condition, and lifecycle assessment indicates that sealing is the efficient long-term treatment, scarce capital should not be absorbed in full gravel rehabilitation that merely resets the regravelling cycle. Such links should instead be earmarked for upgrade, with only minimum safety, access and drainage interventions funded as a holding treatment.

## 3.1 Welfare benefits, employment and skills development

The LCCA case for upgrading high-traffic gravel roads to LVSR standards from TRH24 is, by construction, a partial-equilibrium comparison focused on agency and road user costs. That framing is appropriate for establishing the financial logic for surfacing, but it systematically understates the economic return because several material benefits sit outside the standard budget-accounting boundary and/or accrue to third parties. TRH24 is explicit that, alongside lower long-run maintenance liabilities, sealing programmes generate welfare benefits through (i) labour absorption and skills formation, (ii) reduced reliance on imported heavy plant, (iii) lower rates of disruptive rural–urban migration, (iv) reduced dust and associated health/agricultural damages, and (v) lower water intensity relative to repeated gravelling (Committee of Transport Officials, 2024).

From a labour-market perspective, a sealing programme can be designed as a labour-intensive public investment that converts part of the unemployment burden into productive asset creation. TRH24 notes that sealing can absorb and upskill workers with very low opportunity cost, in contrast to a significant share of gravel maintenance that is intrinsically plant-intensive and difficult to substitute with labour (Committee of Transport Officials, 2024). Consistent with this, Ross and Townshend (2019b) estimate that a programme to seal provincial and municipal gravel roads could generate approximately 7.1 million full-time equivalent (FTE) job opportunities (with 5.5 million associated with surfacing roads currently in poor and very poor condition), concentrated in predominantly rural provinces with high unemployment. When annualised over plausible roll-out horizons, they show order-of-magnitude labour absorption effects (e.g. roughly 475,000 FTE jobs per annum under a 15-year schedule), implying that the programme's benefits are not limited to transport efficiency but extend to employment-intensive demand stimulus and learning-by-doing in the local roads delivery ecosystem.

TRH24 also highlights two environmental resource channels that are particularly relevant for South Africa's rural context and climate trajectory. First, dust from unsealed roads imposes health and productivity externalities: particulate matter small enough to enter the lungs (PM10 and PM2.5) is associated with adverse respiratory outcomes, with documented links between unsealed-road dust and elevated airborne particle matter and respiratory disease incidence in South African communities, particularly among children (Committee of Transport Officials, 2024). TRH24 further records agricultural damages (e.g. reduced yields and higher input costs for orchards adjacent to unsealed roads) and notes that dust palliatives are often criticised on affordability and effectiveness grounds - strengthening the case for surfacing (Committee of Transport Officials, 2024). Second, water consumption for gravel construction and maintenance is non-trivial, with the implication that increasing water scarcity and climate risk further tilt the economic calculus towards sealing in affected regions (Committee of Transport Officials, 2024).

The relevance of these factors for this paper is that extensive shadow-priced welfare benefits strengthen the intertemporal LCCA argument by implying that the economic net present value of a well-targeted surfacing programme is likely materially higher than what is captured in narrow accounting comparisons. Moreover, because many of these gains are spillovers (health, environmental, labour-market, and spatial-equilibrium effects that extend beyond the road authority's budget) there is a strong economic rationale for financing and institutional arrangements that internalise these benefits (e.g. through national co-financing, conditional capital transfers, and procurement modalities that enable labour-intensive delivery and contractor development).

## 3.2 Climate resilience

South Africa's road asset base is increasingly exposed to climate and environmental hazards that raise both the expected cost of maintaining the network and the probability of disruptive events. These risks are economically material because they (i) accelerate deterioration rates (thereby increasing lifecycle agency costs), (ii) increase the frequency of emergency works, and (iii) impose reliability losses on users through periodic inaccessibility and detours. The vulnerability is structurally concentrated in the low-volume rural network, where unpaved roads dominate and where drainage assets and shoulders are often unmaintained as well as underspecified relative to changing hydrological conditions (Committee of Transport Officials, 2024).

Unpaved roads are especially vulnerable to water ingress: intense rainfall rapidly erodes the wearing course, generates rutting and corrugation, and can destabilise the subgrade, often rendering sections impassable and triggering repeated regravelling and reinstatement. This shifts the lifecycle cost profile upward and shortens the effective "maintenance cycle" in high-exposure areas. Empirically, the Development Bank of Southern Africa's (2025) Disaster Recovery Programme analysis cross-referenced RAMS data with CSIR

GreenBook climate-hazard layers and identified 64 631 km of unpaved roads located in areas vulnerable to climate pressures, defined as high rainfall (> 1 500 mm per year) and/or high flood risk. In these vulnerable areas, maintaining gravel to an acceptable level of service becomes a high-frequency, high-variance expenditure commitment, and the expected present value of recurrent maintenance and periodic reinstatement rises relative to a surfaced alternative.

These exposure dynamics also create a fiscal risk-management problem. Where flood risk is high, "reactive" reinstatement after damage becomes a predictable recurrent liability rather than an exceptional shock, particularly as storm intensity increases. TRH24 explicitly notes that climate change will increase the volume and destructive velocity of flood flows. To the economist, this is a classic case of rising expected losses and rising marginal returns to adaptation capex: investing in more resilient standards (notably LVSR) reduces the long-run expected liability and the probability-weighted cost of network disruption.

If no adaptation measures are taken, research suggests that climate change may impose additional annual costs of around US$ 96 million on South Africa's road network by 2030, and US$ 229 million by 2050 (Siyakatshana, et al., 2024; Lacambra, et al., 2020). Clearly, the current reactive approach of the road sector to climate change damages is unsustainable. Regardless of exact point estimates, the direction of travel is clear: climate exposures increase the long-run unit cost of "staying gravel", particularly in high-rainfall and/or flood-prone regions. This strengthens the paper's central proposition that the binding constraint is not the underlying lifecycle logic of upgrading, but the public finance and delivery system's ability to fund and execute the required capital response at scale - before unavoidable environmental shocks repeatedly reset the asset base and consume scarce budgets through emergency rehabilitation.

# 4. Institutional funding arrangements

This section summarises how provincial and municipal roads are funded within South Africa's intergovernmental fiscal system, and why the current mix of instruments tends to reproduce a maintenance-heavy equilibrium. The key point is not that road authorities do not understand the lifecycle case for sealing, but that the budget architecture that governs what can be financed (and when) does not readily convert that case into predictable, multi-year capital upgrading at scale.

## 4.1 Provincial funding arrangements

Provincial road departments are financed predominantly through transfers from the National Revenue Fund, allocated via the Provincial Equitable Share (PES) and conditional grants. Provinces receive the largest share of nationally raised revenue, but their fiscal autonomy is limited: own revenue is small and most spending must be financed from formula-based transfers. Transport is therefore funded within a tight discretionary space and competes directly with large, politically protected functions, particularly education and health. In practice, this means that large capital programmes for provincial roads must either be accommodated within scarce discretionary fiscal space or be supported by a dedicated conditional instrument.

Within this envelope, the Provincial Road Maintenance Grant (PRMG) is the single most important dedicated instrument for roads. However, the PRMG's design focuses on preserving existing assets through routine and periodic maintenance, with only limited scope for rehabilitation. The result is that the instrument that is most predictable for provincial road authorities is structurally aligned with maintenance outputs, while upgrades of unpaved roads to LVSR must typically be financed from the discretionary portion of the PES (or other ad hoc sources).

The PRMG was introduced to protect maintenance budgets, and its conditions reflect a preservation objective: allocations are tied to road asset management plans and may be used for routine maintenance,

periodic maintenance and selected rehabilitation activities. Critically for this paper, upgrading gravel roads to sealed standards is treated as non-qualifying expenditure in the grant's core framework, meaning that large-scale sealing must be financed outside the PRMG. While limited surfacing can be accommodated within rehabilitation provisions, this is capped and does not constitute a programme-level capital upgrading instrument.

Even where the PRMG is not fully spent in a given year, this does not remove the underlying constraint. Upgrading is not a marginal variation of maintenance; it requires project preparation, design, contracting capacity and multi-year cash-flow management. A maintenance-focused conditional grant, administered and monitored largely on annual expenditure compliance, is therefore poorly suited to building an upgrading pipeline.

## 4.2 Municipal funding arrangements

Municipalities finance roads from a combination of the Local Government Equitable Share (LGES), conditional infrastructure grants (notably the Municipal Infrastructure Grant (MIG)), and own revenues. Metropolitan and large urban municipalities raise substantial own revenue. But for the gravel road network, the binding constraint tends to sit with rural and small municipalities that manage extensive unpaved networks but have weak own-revenue bases coupled with limited procurement capacity.

The LGES is an unconditional transfer designed to support free basic services and core governance functions. Although municipal roads are recognised within the broader community services remit, this component is a small share of the overall LGES and is not structured as a dedicated capital envelope. Practically, the LGES supports operating capacity and basic service provision, but it does not create predictable, ring-fenced funding for upgrading roads from unpaved to sealed standards.

Conditional grants can, in principle, finance road upgrading. The MIG is the main municipal infrastructure grant and roads are eligible within its broad mandate to address basic infrastructure backlogs. In practice, MIG resources are stretched across multiple sectors (especially water and sanitation). The result is that road upgrading remains discretionary, often episodic, and poorly aligned with a multi-year upgrading programme. It is therefore an uncertain and fragmented source of financing for systematic gravel-to-sealed transitions.

Own revenue and borrowing capacity differ sharply across the local government system. Metros can often self-fund or borrow for capital works, but smaller municipalities (which manage much of the unpaved road network) typically cannot. This uneven fiscal capacity implies that a purely decentralised strategy to scale up sealing is unlikely to succeed: the jurisdictions with the greatest need are least able to finance the upfront capital outlay, even where the long-run lifecycle case is strong.

## 4.3 Fiscal incentive misalignments

Taken together, these arrangements generate incentive misalignments that discourage lifecycle-efficient upgrading. Subnational authorities face binding liquidity constraints and annual budgeting rules, while a material share of the long-run gains from sealing (lower future disaster liabilities, productivity spillovers, higher tax receipts, small enterprises capacity development, and welfare gains) accrues to the broader economy and the national fiscus. Five constraints are particularly relevant for the mechanism design problem addressed in Section 5.

**Short-term budget horizons and weak intertemporal incentives**

Provincial and municipal budgets are formed and executed within annual appropriations and a three-year MTEF. Sealing programmes require high upfront capital expenditure with benefits realised over decades through lower maintenance, improved reliability and wider economic spillovers. Without an institutional mechanism that allows road authorities to convert future savings into current spending capacity, the rational outcome is underinvestment in upgrades and over-reliance on recurrent maintenance.

**Grant design locks in maintenance outputs**

The PRMG's conditions strengthen this intertemporal bias by privileging maintenance outputs over capital deepening. Because the main dedicated roads grant is not structured to fund upgrading, provinces maximise compliance and coverage by producing routine and periodic maintenance outputs. This is efficient within the grant's rules, but second-best from a system perspective when repeated re-gravelling is more expensive over the lifecycle than a well-targeted transition to LVSR.

**Vertical fiscal imbalance and limited borrowing space**

Vertical fiscal imbalance is a further constraint. Provinces have limited own-revenue instruments and cannot readily borrow for infrastructure, while many municipalities lack the revenue stability and creditworthiness required to finance multi-year upgrading. The fiscal system therefore concentrates the ability to fund large capital programmes at national level, even though the unpaved network sits at provincial and municipal levels.

**Fragmented accountability and coordination failures**

Responsibility for the unpaved network is fragmented across multiple authorities, while many benefits of upgrading spill across jurisdictions (for example, better market access, reduced logistics costs and improved resilience). In a multi-principal, multi-agent environment, coordination is costly and no single budget holder fully internalises the return to upgrading. This weakens accountability for long-run asset re-optimisation and reinforces incremental, short-horizon maintenance decisions.

**Political economy and delivery constraints**

Finally, the political economy of intergovernmental transfers reinforces short-termism. Maintenance and re-gravelling can be spread across many localities and reported as immediate activity, while upgrading requires corridor choices, stronger project preparation and more complex procurement. Where delivery capacity is weak, additional funding alone will not translate into surfaced kilometres at scale. Financing reforms therefore need to be paired with delivery arrangements that expand implementation capacity (project preparation, procurement throughput and quality assurance) as well as align incentives.

# 5. Proposed financing mechanism

This section sets out an implementable financing reform to upgrade priority provincial and municipal unpaved roads to low-volume sealed standards. The objective is to create a credible multi-year capital pathway that is economically defensible (life-cycle efficiency, network spillovers, resilience) and administratively implementable within South Africa's existing public financial management (PFM) system (National Treasury, 2015; National Treasury, 2019/20; Government of South Africa, 2024).

We propose an Unpaved Roads Upgrade Facility (URUF): a conditional, multi-year capital instrument that finances the upgrading of priority provincial and municipal unpaved links to LVSR standards, while hard-wiring post-upgrade preservation (maintenance performance) and minimum service levels into the financing

contract. The facility is designed to be implementable within South Africa's existing public financial management toolkit for intergovernmental transfers - particularly conditional grants - using established enforcement levers (withholding, stopping and reallocation) and standard infrastructure stage-gate controls (Division of Revenue Act; SIPDM/IDMS) (Government of South Africa, 2024; National Treasury, 2015).

## 5.1 Objective and scope of the URUF

The URUF's economic objective is to maximise sustained all-weather access and network reliability per rand spent over the asset life, by (i) prioritising upgrades that reduce whole-of-life costs relative to repeated regravelling/repairs, and (ii) correcting the intergovernmental incentive problem that leads to under-investment in unpaved roads. Practically, the URUF aims to shift spending from recurrently repairing climate-exposed gravel roads towards durable, low-cost sealed solutions that are appropriate for low traffic volumes, available local materials and constrained maintenance regimes

The intended scope is for the URUF to finance capital upgrading of unpaved provincial and municipal roads (and essential associated drainage and safety features) to LVSR standards (SATCC, 2003). It does not fund routine maintenance as a primary purpose; rather, it funds upgrading plus a limited, performance-linked preservation support element (a holdback/release mechanism and a small outcome-linked top-up) to ensure the upgraded asset is actually preserved.

URUF should not be expanded into a general paved-road rehabilitation facility. Poorly maintained paved roads are economically important, but they are already within the ordinary mandate of road asset management: condition assessments identify the required rehabilitation or resurfacing treatment, and funding should be channelled through existing maintenance and rehabilitation instruments. The unresolved policy problem addressed by URUF is narrower and more specific: economically justified unpaved-road upgrades are persistently deferred because the capital outlay, lifecycle benefits, fiscal dividends and intergovernmental incentives are misaligned. The facility is therefore designed to solve the gravel-road regravelling trap, not to substitute for existing paved-road rehabilitation programmes.

## 5.2 Interaction with existing intergovernmental instruments

The URUF is not intended to replace existing intergovernmental instruments for roads. Rather, it is designed to fill the missing capital upgrading function in the current architecture while preserving the integrity of instruments whose core purpose is maintenance or multi-sector backlogs. In practice, this requires a clear division of labour between the URUF, the PRMG, and the MIG, to avoid duplication, substitution, and perverse incentives.

For provincial roads, the intention is that the URUF funds the upgrade while the PRMG preserves the upgraded asset. The PRMG is the single most important dedicated provincial roads instrument, but its framework is structurally aligned to routine and periodic maintenance and does not provide a programme-level pathway for systematic gravel-to-sealed upgrading. The URUF therefore finances the lumpy capital step (upgrading selected priority unpaved links to LVSR standards) together with a limited, performance-linked preservation support element (retention/holdback and condition-linked release) during the defects-liability and early life period. Thereafter, the upgraded links should be explicitly treated as part of the province's preservation portfolio, with routine and periodic preservation financed through the province's own budget and, where applicable, PRMG-supported programmes. This operationalises the paper's broader logic: URUF converts a recurrent gravel liability into a sealed asset, while PRMG (and provincial budgets) prevent the asset from reverting into a new backlog in sealed form.

To make this transition enforceable, URUF should require that each upgraded corridor is: (i) added to the provincial road asset management plan and annual maintenance programme, and (ii) accompanied by a funded routine preservation and reseal plan, which becomes a condition for release of the URUF durability holdback and for continued access to future URUF tranches (National Treasury, 2015; Government of South Africa, 2024). This strengthens complementarity: PRMG remains focused on preservation outcomes, while URUF funds the capital deepening that PRMG is not designed to deliver at scale.

For municipal roads, the intention is that the URUF creates a dedicated upgrading pathway while the MIG remains multi-sector and episodic for roads. The MIG can in principle fund road upgrading, but in practice it is stretched across multiple sectors (notably water and sanitation) and road upgrading under MIG tends to be discretionary and episodic rather than aligned to a multi-year sealing programme. Under the URUF, municipal LVSR upgrading would move onto a dedicated, rules-based pipeline, while MIG continues to finance broader municipal infrastructure backlogs. Where municipalities do have MIG allocations for roads, URUF can allow co-funding (cash or in-kind) via MIG only if it is (i) explicitly committed in the Year 1/2 pipeline stage and (ii) not double-counted as both URUF expenditure and MIG delivery. This preserves MIG's multi-sector mandate while enabling municipalities to leverage their existing capital envelopes into a disciplined LVSR upgrade programme.

The operational bridge requires explicit no-substitution rules. URUF must not displace baseline PRMG-supported maintenance effort (or municipal own-budget maintenance), and it must not be used as a backdoor mechanism to finance routine maintenance that existing instruments are designed to fund. This is consistent with the facility's stated scope - capital upgrading plus limited, performance-linked preservation support - not routine maintenance as a primary purpose. In addition, URUF should require a maintenance covenant and minimum own-effort conditions so that the creation of a new upgrading instrument does not weaken preservation incentives elsewhere in the network (Government of South Africa, 2024).

## 5.3 Institutional form and governance of the URUF

The URUF should be constituted as either (i) a new Schedule-based conditional grant, or (ii) a dedicated ring-fenced window within an existing capital conditional grant, with a stable rule set across the MTEF (National Treasury, 2025). The operational logic is to use grant frameworks and conditions (rather than bespoke legislation) as the binding mechanism, supported by the Division of Revenue Act's established remedies for under-performance (Government of South Africa, 2024).

The URUF's appraisal and disbursement gates must map directly to the Infrastructure Delivery Management System control framework embedded in the Standard for Infrastructure Procurement and Delivery Management (SIPDM), so that funding release is anchored to recognised end-of-stage deliverables (National Treasury, 2015). The URUF should also explicitly adopt National Treasury's infrastructure delivery/procurement minimum requirements (FIDPM/IDMS) as part of its grant conditions (National Treasury, 2019/20; National Treasury, 2021).

## 5.4 Roles

To operationalise URUF as a credible intergovernmental financing contract, the institutional assignment of responsibilities must be explicit. Clear role definition reduces principal–agent ambiguity, strengthens accountability for life-cycle outcomes, and ensures that enforcement tools (stage-gates, withholding, stopping and reallocation) can be applied predictably rather than on ad hoc discretion. The facility therefore specifies four core roles (funder/principal, transferring officer, implementers/agents, and programme

support and contractor development) aligned to South Africa's established conditional-grant architecture and MTEF budgeting framework.

- Funder/principal: National government (via the national fiscus) sets the rules, allocates budgets over the MTEF, and enforces performance through conditionality.
- Transferring officer: The designated national department (the National Department of Transport) administers the grant framework, approves projects into the facility pipeline, and triggers withholding/stopping/reallocation where required.
- Implementers/agents: provincial roads authorities and eligible municipalities deliver projects either directly or, where capacity is weak, through an accredited implementing agent under an agency arrangement (with accountability and reporting still enforced through the grant conditions). This approach avoids needing to invent a new institutional form and instead uses familiar intergovernmental mechanisms.
- Programme support and contractor development: a national programme support unit provides standard templates and reference designs, supports implementers' procurement and contract management, and administers contractor-capitalisation support (including appraisals for discretionary support) at arm's length from implementing agents.

This paper sets out the policy design of the facility; it is not intended to substitute for the operational guidance that would be needed before roll-out. That guidance should clarify decision rights, approval powers, reporting obligations, escalation routes and accountability lines, so that programme support arrangements strengthen delivery without blurring formal public finance responsibilities. To operationalise this role delineation, a concise suite of URUF implementation manuals should be commissioned before full roll-out. These should include:

- an URUF operating manual, setting out governance arrangements, decision rights, workflow, reporting calendars and escalation processes;
- a grant compliance and financial management manual, translating grant conditions into practical obligations for transferring and receiving authorities, including tranche claims, documentation, audit trails and remedies for under-performance;
- a pipeline, prioritisation and stage-gate manual, covering project nomination, eligibility screening, lifecycle-cost comparison, readiness requirements, DLI evidence and independent verification; and
- a procurement, contracting and programme support manual, clarifying approved procurement routes, contract packaging, support-unit functions, limits of authority, contract-management support and escalation of delivery risks;

Technical design standards, LVSR treatment options, engineering assessment, drainage and material specifications should not be recreated in a separate URUF design manual. These should instead be adopted by reference from established guidance, especially TRH24 and other applicable national road engineering standards. URUF guidance should only specify how compliance with those standards is evidenced at each stage gate.

## 5.5 Prioritisation schedule and project selection protocol

To make the URUF allocatively efficient and politically defensible, project selection should be anchored in a published, auditable prioritisation schedule rather than ad hoc nominations. The schedule should translate a service-first objective (basic access and reliable year-round connectivity) into a cost-effective, multi-year programme of LVSR upgrades, while remaining fully compliant with South Africa's infrastructure delivery control framework (National Treasury, 2015; National Treasury, 2019/20).

**Step 1: Classify and prioritise the unpaved road network**

URUF eligibility should begin with an economics-based classification that distinguishes (i) roads required for access to constitutionally protected basic services and (ii) roads that sustain and potentially boost high levels of economic activity - recognising that many links are multi-functional (Townshend, 2019; SANRAL, 2025). In practice, each candidate unpaved road should be tagged and sequenced as follows:

1. Basic Access Roads-1A: Basic access with industrial support
   - provide essential access for some rural households to schools and healthcare facilities; and
   - make a material contribution to GDP via industrial support.
2. Basic Access Roads-1B: Basic access without industrial support
   - provide essential access for some rural households to schools and healthcare facilities; but
   - do not make a material contribution to GDP via industrial support.
3. Strategic Roads (industrial support throughout the business cycle)
   - Support the highest contribution to economic growth via industrial support, robust to business/commodity cycle fluctuations.
4. Tactical Roads (cyclically sensitive industrial support, no basic access)
   - support positive contributions to economic growth only under favourable conditions in business cycles; and
   - do not irreplaceably provide rural households with access to schools and healthcare facilities.
5. Surplus Roads (candidate for deproclamation / local user management and financing)
   - removal would generate a net economic saving; and
   - removal would not deprive communities of essential access to schools and healthcare facilities.

This classification and sequencing is not a “nice-to-have”: it is what allows URUF to apply a differentiated social welfare logic - protecting basic access first while still prioritising upgrades that materially reduce economy-wide logistics frictions.

**Step 2: build the prioritisation schedule using a transparent cost-effectiveness rule**

Within the eligible classes above (excluding surplus roads), URUF should require implementing agents to produce a rolling prioritisation schedule that ranks candidate roads by a simple, replicable cost-effectiveness metric - consistent with the approach set out and piloted for South Africa’s road network prioritisation model (Townshend, 2019; SANRAL, 2025).

A practical URUF-ready specification is:

1. define the treatment decision being displaced: identify the “do-minimum” gravel pathway for each link (routine grading + periodic regravelling and associated spot repairs), based on condition triggers/road management standards used in pavement/asset management practice (e.g. condition-index-triggered interventions) (Committee of Transport Officials, 1994).
2. define the upgrade alternative: specify the LVSR treatment (e.g. appropriate low-volume seal standard using New (3rd-millennium) Modified Emulsion techniques as detailed in TRH24 (SANRAL, 2025)) plus the post-upgrade preservation plan.
3. compute a cost-effectiveness ratio (CER) that ranks projects within each class using a single headline numerator and denominator, for example:
   a. Effectiveness proxy: heavy-vehicle kilometres (HV-km) protected / enabled, where freight intensity is the dominant economic channel; and/or an access-weighted proxy for basic services routes (e.g., population served and service nodes connected)

b. Cost: present value (PV) of incremental costs of upgrading and preserving the LVSR option relative to the gravel pathway over a fixed horizon (e.g. 15–30 years)

The prioritisation schedule should also include risk-sensitive utility analysis within each prioritisation class, as defined by Townshend (2019). That is, climate risk should affect comparisons of one basic access road with another, or one strategic road with another, but should not complicate the prioritisation categories. This is because the most risk-exposed road is not necessarily the road with the highest public value. At the same time, risk and its valuation are understood by economists as part of utility, not something extraneous to it. Where flood, rainfall, erosion or drainage risks materially increase the expected cost of retaining a gravel standard, these risks should enter the within-basket ranking of candidate links. Practically, this means adjusting the lifecycle-cost and utility comparison to reflect not only expected losses, but also the distribution of those losses: the variance of likely outcomes, the degree of downside skew where losses are concentrated in adverse states, and the presence of fat-tailed risks where low-probability events could generate severe access failure, emergency reinstatement costs or prolonged service disruption. Such analysis falls within the skill set of a trained public finance economist, but is not a standard element of accounting practice. Thuse relevant human capital costs should be budgeted for this follow-up work. The analysis should be updated periodically as climate models, hydrological data, flood maps and observed damage patterns change. The purpose is to avoid both extremes: underweighting climate exposure in vulnerable links, and overallocating scarce URUF resources to the highest-risk assets irrespective of their broader social and economic value.

**Step 3: convert the ranking into a multi-year, deliverable URUF pipeline**

The prioritisation schedule must be transformed into a three-year rolling pipeline aligned to the MTEF and URUF stage-gates:

- year 1: ready-to-implement projects (design complete; procurement plan confirmed)
- year 2: projects completing design and readiness requirements
- year 3: pre-feasibility and screening (traffic/condition verification; materials/drainage screening)

This pipeline approach is essential for two reasons: (i) it makes the facility implementable under SIPDM/FIDPM gatekeeping, and (ii) it enables Treasury to make credible multi-year commitments without losing portfolio control (National Treasury, 2015; National Treasury, 2019/20).

**Step 4: embed anti-substitution rules and upgrade substitution logic**

To ensure URUF is fiscally complementary and does not simply displace provincial/municipal effort, selection rules should include:

- Anti-substitution covenant: URUF-financed links must not trigger a reduction in the implementing authority's baseline maintenance allocations for the remaining network (measured against a rolling historical average, with documented exceptions only where fiscally unavoidable).
- Upgrade substitution test: a gravel link should only enter the URUF upgrade schedule if it is (i) already high on the maintenance prioritisation schedule (i.e. would otherwise absorb recurrent regravelling) and (ii) the LVSR option is demonstrably lower-cost on a life-cycle basis or materially improves year-round serviceability at acceptable incremental PV cost.

This substitution test is the mechanism that ties URUF directly to liability management: the facility is not a generic expansion fund; it is a rules-based instrument for replacing recurring gravel liabilities with a more sustainable LVSR maintenance pathway.

## 5.6 Allocation mechanism across provinces and municipalities

Annual URUF allocations should combine the following two-part allocation system. This structure mirrors how South Africa already uses formula drivers and performance incentives in road transfers.

1. Base formula allocation (predictability): a transparent formula reflecting (i) the size of the unpaved backlog/network exposure, (ii) traffic and weather/climate cost drivers, and (iii) service-access needs; and

2. Performance/pipeline allocation (incentives): a reserved share (e.g. 15–25%) distributed on readiness and verified delivery/condition performance.

The base envelope should be appropriated nationally (i.e. borne primarily by National Treasury through the national budget), because a large share of benefits accrues to the national fiscus and broader economy: higher taxable economic activity from improved connectivity; reduced future maintenance and rehabilitation pressure on provincial transfers (including pressure within the PRMG envelope); fewer and smaller emergency claims following flood events when critical access routes are more resilient; and higher employment (including low-skilled labour demand in upgrading programmes and routine maintenance of sealed surfaces), which can indirectly reduce fiscal pressure through lower grant dependence. The economic logic is that the national fiscus internalises more of these spillovers than any individual province or municipality, so central financing better aligns payers with beneficiaries. This is an incidence and incentive argument, not merely an affordability argument. The grant design then ensures sub-national agencies still face strong delivery and preservation obligations.

Quantifying this national fiscal dividend is an important next step for URUF preparation, but it should not be attempted through a single high-level national estimate anchored in a general-equilibrium model of South Africa. The relevant variables are too spatially and institutionally heterogeneous for that approach to be suitably informative. The appropriate method is therefore a bespoke fiscal-dividend account built from a jigsaw of partial-equilibrium analyses, undertaken at no higher than provincial level and, where necessary, at district level. Each analysis should compare the URUF treatment option with the credible counterfactual over the asset life and estimate four channels: (i) incremental tax receipts associated with improved market access, freight reliability, labour mobility and local economic activity; (ii) avoided recurrent maintenance, regravelling and rehabilitation pressures on provincial and municipal road budgets and related transfers; (iii) reduced expected disaster-response and reinstatement liabilities where more resilient access routes lower flood and storm-damage exposure; and (iv) employment and income effects from construction and maintenance delivery, including any indirect reduction in household distress and fiscal pressure. These jurisdiction-level estimates can then be assembled using a transparent aggregation methodology that preserves local assumptions rather than imposing a single national coefficient. This would convert the fiscal-dividend argument from a qualitative rationale into a quantified investment case for the national budget.

## 5.7 Disbursement structure, stage gates and DLIs

The URUF should have windows:

- Window A – pipeline/preparation: limited funding for traffic counts, basic investigations, concept/design to the required stage, and whole-of-life comparison - explicitly to avoid “poor spending” that is actually a readiness failure.

- Window B – delivery and preservation: construction financing plus retention/holdbacks linked to post-completion condition.

Disbursements are released only when specified SIPDM end-of-stage deliverables are approved. This converts URUF funding into an enforceable fiscal contract rather than a block transfer. A practical structure is:

- Tranche 1 (readiness): on approval of the completed appraisal/design package to the defined gate.
- Tranche 2 (construction progress): against verified physical progress milestones.
- Tranche 3 (completion): on practical completion and opening to traffic.
- Tranche 4 (durability holdback): released only after the defects-liability period, conditional on independent verification of minimum condition/service levels.

The URUF should use a small set of auditable indicators (DLIs) consistent with international results-linked financing practice (World Bank, 2021). The DLIs should be expressed as outputs and intermediate outcomes (not inputs), and must be independently verifiable (World Bank, 2021). A minimal DLI set could be:

- DLI 1 – appraisal readiness: approved whole-of-life comparison + design package at the required gate (SIPDM-aligned).
- DLI 2 – delivery output: kilometres upgraded to the specified LVSR standard (including drainage essentials).
- DLI 3 – durability outcome: condition/service level above threshold at the end of defects-liability.
- DLI 4 – preservation execution: evidence that routine preservation actions were funded and executed during the verification window.
- DLI 5 – data transparency: submission of asset/condition data to a national dashboard.

## 5.8 Enforcement and fiscal remedies

Verification must be structurally independent from implementers to prevent gaming. The URUF should fund an independent verification agent (or panel) to: confirm baseline condition and traffic estimates at approval; verify physical outputs at completion; and certify condition/service levels at the end of the defects-liability period. This mirrors the logic of performance-based roads contracting, which hinges on measurable service levels rather than quantities of inputs (World Bank, 2017).

The URUF should rely on existing statutory conditional-grant remedies - rather than bespoke penalties - to preserve feasibility and legal certainty. The Division of Revenue Act provides for (Government of South Africa, 2024):

- withholding of allocations,
- stopping of allocations,
- reallocation of funds, and
- rules for unspent conditional allocations/rollovers, all of which can be triggered via the grant framework when performance and compliance conditions are not met.

We outline a potential ex-ante enforcement ladder:

- Step 1 – withhold: if a gate/DLI is missed, the next tranche is automatically withheld.
- Step 2 – remedial plan: a time-bound remedial plan is required (with technical support where appropriate).

- Step 3 – stop and reallocate: if remedial actions fail, the project/allocation is stopped and reallocated to a better-performing pipeline (or implemented through an accredited agent).
- Step 4 – preferential access: strong performers receive faster access to future tranches and the performance pool, strengthening the "carrot" side of the contract.

## 5.9 Multi-year commitment structure and anti-substitution rules

Credibility requires that URUF funding is predictable and multi-year:

- MTEF stability: the URUF should be announced and maintained as a stable programme over the MTEF, with parameter updates (unit cost benchmarks; eligibility thresholds) rather than annual redesign.
- Pipeline discipline: projects enter the URUF as a rolling 3-year pipeline, but only become "committed" once they pass the defined readiness gate (SIPDM-aligned).
- Rollover rules: where timing issues arise, the URUF should use the statutory rollover/unspent conditional allocation mechanism where justified, rather than tolerating weak spending control.

A core risk is that URUF funds could displace (rather than add to) provincial and municipal roads efforts, weakening net impact and recreating future backlogs. The URUF therefore requires explicit complementarity rules:

- Capital complementarity covenant: receiving jurisdictions must maintain a minimum level of own-funded roads capital effort (defined as a trailing average share of their roads budget, excluding URUF). Non-compliance triggers withholding of new URUF approvals.
- Maintenance covenant: jurisdictions must submit (and execute) a funded post-upgrade preservation plan for each corridor; failure triggers withholding of the durability holdback and reduces access to the performance pool.
- No substitution of existing maintenance grants: the URUF cannot be used to replace routine maintenance financed through existing programmes. This is consistent with the logic that the provincial roads maintenance grant is supplementary and provinces are expected to fund new roads from their own budgets while using the grant to supplement maintenance and upgrading of existing roads.
- Co-funding requirement: a modest co-funding contribution (cash or in-kind) should be required to strengthen ownership and screen out low-commitment projects, with calibrated exemptions for genuinely fiscally constrained municipalities to avoid excluding poor areas.
- Condition-linked efficiency dividend: any post-upgrade performance top-up must be payable only against verified road condition outcomes (not reported spending), aligning incentives with preservation (World Bank, 2017; World Bank, 2021).

## 5.10 Precedence for the URUF

This core design logic is well precedented: internationally, governments and development finance institutions have increasingly used results-linked public financing to convert multi-year infrastructure intent into credible delivery - by linking fund flows to a small number of verifiable outputs and service-level indicators, rather than relying on ex ante allocations and input compliance alone (World Bank, 2012; World Bank, 2025a). In fact, South Africa has an institutional precedent for this architecture through the World Bank's first Program-for-Results operation in the country, the South Africa Metro Trading Services Program, which is explicitly structured around disbursement against verified results and associated institutional strengthening (World Bank, 2025b; World Bank, 2025c).

Relevant comparators also exist in intergovernmental performance frameworks used to sharpen incentives and improve accountability. Indonesia's Dana Insentif Daerah is a notable example of a performance-oriented transfer mechanism, while Australian-funded performance-based grants for Indonesian utilities illustrate how a grant facility can combine targeted technical assistance with performance-contingent disbursement to strengthen delivery capability in weaker jurisdictions (World Bank, 2020; DFAT, 2024). In the rural roads domain specifically, India's Pradhan Mantri Gram Sadak Yojana demonstrates how a nationally driven programme can scale access-road upgrades through standardised systems, including formal quality monitoring arrangements and national monitoring platforms (Herrera Dappe et al., 2021). These precedents support the central proposition underpinning design of the URUF: that nationally funded, rules-based facilities - paired with objective verification and enforceable maintenance covenants - can deliver unpaved network upgrades at scale, even where sub-national fiscal space and implementation capacity are binding constraints.

The URUF is therefore designed to align with South Africa's existing infrastructure delivery control framework and procurement standards - specifically the Standard for Infrastructure Procurement and Delivery Management (SIPDM) and subsequent Treasury frameworks and guidance that operationalise stage-gates, roles, and procurement controls (National Treasury, 2015; National Treasury, 2019/20). It should be established either as (i) a new conditional grant, or (ii) a dedicated window within an existing capital grant, with clear rules stable across the MTEF, so that project preparation, procurement, delivery, and post-completion verification can be planned and enforced on a multi-year basis.

# 6. Procurement and capacity building regime

The URUF will succeed or fail on delivery. A multi-year financing commitment is necessary, but not sufficient: the programme also requires a procurement and capacity-building regime that converts predictable funding into repeatable delivery, protects construction quality and whole-of-life performance, and expands local implementation capacity without creating transaction costs so high that delivery stalls. For LVSR, the binding risks are typically: (i) weak project preparation and contract management, (ii) fragmented contracting that overwhelms market depth and supervision capacity, and (iii) quality failure modes where kilometres are delivered but durability is not.

A central implementation premise of URUF is that the capacities required to execute these functions cannot be assumed to exist in every road authority. In some provinces and municipalities, the constraint will not only be funding, but the absence or fragility of the technical, procurement, contract-management, quality-assurance and social-process capabilities needed to convert allocations into durable road assets. For this reason, URUF should include a dedicated programme support facility, funded as part of the overall instrument, to support weaker authorities before and during implementation. This support facility should provide practical assistance with pipeline preparation, feasibility screening, standard documentation, procurement packaging, contract management, site supervision, stage-gate evidence, reporting and independent verification. The purpose is not to substitute permanently for road authorities, but to ensure that the first phase of URUF does not fail because funds are allocated to institutions that cannot yet execute the required functions unaided.

## 6.1 Delivery model and implementing arrangements

The facility should operate on a capability-tiered delivery model. Provinces and metros that demonstrate adequate technical, procurement and contract-management capacity may deliver directly, subject to URUF's standard templates, benchmarks and verification requirements. Where capacity is weak, particularly in smaller municipalities, delivery support should be structured through an accredited implementing arrangement under a clear agency agreement. This should not be interpreted as a proposal to expand

SANRAL's mandate by default, or to shift responsibility wholesale to any single national entity. That approach risks reproducing existing delivery constraints and may be poorly suited to low-volume access-road projects, where community-interface management, ward-level politics, local contractor markets and routine maintenance capability are central to success. Implementing agents - whether a provincial roads authority, provincial implementing unit, SANRAL, or another fit-for-purpose delivery vehicle - should therefore be appointed only where they have demonstrated capacity, available delivery bandwidth and specific suitability for the project context. This avoids a common failure mode in infrastructure grants: transferring funds into weak delivery environments and then treating non-delivery as a compliance problem after the fact, rather than as a predictable design risk that should have been addressed at entry.

## 6.2 Procurement strategy and contract forms

Because URUF projects are technically repeatable (standard low-volume cross-sections, drainage, seals, and basic safety features), the procurement regime should deliberately exploit repetition economies. Four design choices matter most:

- Area-based packaging: bundle multiple links within a defined geography into packages sized to local market depth. This reduces mobilisation costs, supports local supply chains, and simplifies supervision relative to dispersing many small stand-alone contracts across wide areas.
- Panel-based call-offs for small works: within area-based packages, establish local panels (using databases from the Construction Industry Development Board and Central Supplier Database) for Grades 1–3 and allocate measured work orders/call-offs based on competence, continuity and verified performance, with published award criteria to reduce discretion and corruption risk.
- Framework/term contracting for standard solutions: use SIPDM-compliant framework agreements or term contracts for recurring work items (low-volume sealing, drainage rehabilitation, spot gravelling, and routine preservation), with call-off orders linked to pre-approved designs and standard bill items. The objective is to shorten the time between appraisal and start-on-site while preserving competitive pricing and auditability (National Treasury, 2015; National Treasury, 2019/20).
- Durability incentives by design: embed meaningful retention and a defects-liability regime, with the final tranche (or the URUF "efficiency dividend") released only after independent verification that condition and service-level thresholds are met. This aligns procurement incentives with whole-of-life outcomes rather than short-run expenditure (World Bank, 2014).

A practical default for low-volume sealed upgrades is a design-and-build contract using standardised reference designs, paired with a short, explicitly defined performance-based maintenance period (for example, two to three years) focused on a small number of observable service-level indicators (e.g. passability, drainage functionality, and surface distress thresholds). The purpose is not to import complex output- and performance-based road contract models that exceed local capacity, but to introduce sufficient outcome orientation to prevent "build and walk away" incentives.

## 6.3 Quality assurance, verification and transparency

Explicit attention must be given to quality assurance, verification, and transparency. Weak quality assurance is a common failure mode in access-road programmes because kilometre targets are easier to meet than durability targets. The URUF should therefore institutionalise a light-but-credible monitoring architecture with four features:

- tiered quality control: (i) contractor/engineer site controls, (ii) independent provincial/state quality monitoring, and (iii) random national audits;

- public procurement and delivery transparency: publish package scopes, award criteria, awarded rates, subcontracting compliance, and stage-gate performance at project and portfolio level; where feasible, include community-observer participation in defining acceptance criteria and verifying completion to strengthen local legitimacy.
- stage-gate evidence: geo-tagged evidence (photographic and basic test results) at key gates (pre-construction, base completion, surfacing, and handover), linked to payment milestones; and
- portfolio dashboard: a simple dashboard (roads upgraded, unit costs, stage-gate compliance, defects) to reduce discretion and strengthen accountability.

Large-scale rural roads delivery experience underscores the importance of standardisation and strong monitoring systems for quality and transparency (Comptroller and Auditor General of India, 2016; Press Information Bureau, 2025).

Continuity within a local area is the fulcrum of sustainable small-contractor development. Policy and procurement often assume “development” means pushing firms up the CIDB grading ladder. In practice, this can create a top-heavy pyramid: each step up attracts many under-resourced entrants, tender prices are driven down, supervision thins out, and business failure risk rises. URUF should instead aim to populate every locality with contractors operating at the maximum level of stable competence for their Grade, supported by reliable repeat work and short transport distances.

## 6.4 Small contractor development and labour-intensive delivery

Small contractor development and labour-intensive delivery have historically been managed and supported erratically in South Africa. A major policy advantage of URUF is that it can expand the local delivery industry for low-volume roads. Routine maintenance, drainage clearing, shoulders, roadside works, and selected earthworks are well-suited to local small contractors and micro-enterprises, while surfacing and higher-risk structural items typically require stronger technical oversight. South African guidance already provides a foundation for labour-intensive methods and contractor development; the facility should leverage these rather than create bespoke models from scratch (Republic of South Africa, 2004; Construction Industry Development Board, 2007).

URUF should operationalise small contractor development through three design principles:

- appropriate work packaging: reserve clearly specified, lower-complexity work items for smaller contractors, while keeping surfacing and other high-risk items within packages that ensure adequate supervision and technical accountability.
- structured subcontracting and management-contractor models: where main contracts are too large for small firms, subcontracting requirements should be embedded as enforceable obligations. SANRAL’s interim preferential procurement policy provides a precedent, including governance controls such as payment timeliness requirements (SANRAL, 2023). A management contractor plus multiple subcontractors model, paired with cost-plus payment to subcontractors and an SMME support office, can further reduce exploitation risks and improve work allocation continuity.
- capability-first development: prioritise stable, repeat work within local geographies so that skills, equipment, and working capital can accumulate, rather than pushing contractors into rapid grade progression on the back of infrequent, oversized projects.

Beyond access to work, URUF should explicitly recognise the enabling inputs required for a viable small contracting business:

- capital and credit: working-capital bridging and partial guarantees (or facility-backed supplier credit) linked to a medium-term pipeline, so contractors can mobilise and buy inputs when payment cycles lag;
- continuity: multi-year call-offs (e.g., three to five years) that justify team formation, training, and loan repayment, rather than fragmented once-off contracts with long idle periods;
- access to plant: regional plant-hire pools (including small plant such as walk-behind compactors) so firms do not carry idle equipment costs; where commercial hire is thin, provincial/municipal authorities can host shared pools with clear access rules;
- access to materials: longer-term framework supply contracts (or facility-held inventories) from which small contractors can draw standard inputs, reducing supplier risk and enabling controlled credit for items such as premix and stabilising agents;
- training and learning-curve finance: accredited on-the-job training with early-period payment rules that recognise low initial productivity; for example, a defined "training phase" paid on verified cost-plus (with caps and productivity benchmarks) that tapers to unit rates once output norms are met;
- back-office administration: a local "small business support office" (municipal finance unit, SMME or NGO) that handles compliance (SARS, UIF, etc.), payroll and attendance registers, invoicing, ordering, and basic plant service scheduling, allowing owners to focus on productivity and quality.

To avoid a fragmented, per-project set-aside that invites waste, URUF should operationalise these supports through an ancillary Contractor Capitalisation Facility (CCF): a centrally managed mechanism that provides project-enabling operating capital (financial, plant and materials) and targeted capability support where appraisal shows a credible opportunity to build local delivery capacity.

- automatic ancillary window: standardised support that local contractors almost always need, procured transparently at scale. This includes access to plant pools, controlled materials drawdowns, and basic tools/safety equipment provided on a rental/return basis. Where technically appropriate, the facility can also make TRH24-aligned NME-related inputs available through its supply arrangements, creating a demand-pull incentive for suitable lower-life-cycle-cost solutions.
- discretionary capability window: a competitive, needs-based contractor development package awarded only where appraisal identifies adequate pipeline, supervision and capable emerging firms. Support can combine working-capital bridging, preferential input access, structured mentoring (planning, cash-flow management, compliance, workload programming and claims avoidance), and accredited workforce training. Awards should be time-bound, milestone-based and reversible if conditions are breached.
- rigorous governance and supply-chain safeguards: the CCF should be administered at national level (as part of the URUF programme support function), with clear separation of duties between implementers and approvals; an asset register for any pooled plant; controlled materials release linked to stage-gate evidence; random national audits; and publication of award decisions and performance to deter capture and collusion.

URUF should avoid perverse contractor-development benchmarks that equate "development" with rapid CIDB grade graduation. For the maintenance and LVSR ancillary works that URUF will scale, CIDB Grades 1–3 function economically less like a temporary stepping stone and more like a locality-based service industry, where viability depends on repeat work, short travel distances, predictable payment and accumulated practical competence. Past contractor-development models have often weakened this segment by encouraging firms to move out of lower-grade work as quickly as possible, leaving routine maintenance, drainage, spot repairs, labour-intensive works and small LVSR-related packages under-supplied by competent local contractors.

URUF should deliberately push back against this pattern by repopulating the lower and middle tiers of the roads market with contractors that are technically competent, financially stable and specialised in repeatable lower-level works. This requires contract packaging that avoids short, single-operation contracts followed by long idle periods, and instead offers longer-duration, multi-activity contracts or stable call-offs within manageable travel distances. Contractor development should be monitored through sustainability and performance indicators - repeat participation, quality, payment timeliness, survival, mentorship completion and successful delivery of measured work orders - rather than graduation counts alone. The programme should reward demonstrated competence and continuity in lower-tier delivery, not only upward movement into larger and riskier contracts.

## 6.5 Pipeline support, technical assistance and contract management capability

The URUF should institutionalise delivery support, technical assistance, and SME capacity building as funded, rules-based functions. Sub-national bottlenecks often reflect shortcomings in project preparation (design readiness, basic investigations, procurement documentation) and contract management rather than a lack of capital alone. The facility should therefore finance: (i) standardised preparation templates and pipeline support (traffic counts, geotechnical screening, reference designs and bills), (ii) surge engineering supervision support for weak implementers, and (iii) practical contract-management coaching (payments, variation control, claims avoidance, quality documentation). Technical assistance should be mandatory but tiered by capacity, and linked to verified performance triggers.

The programme support function should be operationalised through approved manuals and standard operating procedures, rather than through informal technical assistance. This is important because support structures can strengthen preparation, verification and delivery discipline, but they should not blur the accountability of the transferring authority for grant design and disbursement decisions, or the accountability of receiving authorities for procurement, contract management and asset preservation.

## 6.6 Project Liaison Committees and social process readiness

URUF should treat Project Liaison Committee (PLC) processes as a funded, non-negotiable element of project readiness. Poorly managed PLC processes can delay or derail upgrades and can disincentivise officials from pursuing upgrades, which are socially and procedurally more exposed than routine repairs. The PLC should therefore be understood not merely as a consultation forum, but as an operational risk-management mechanism. Its core function is to identify, represent and manage the local actors who may otherwise exercise a de facto veto over implementation, including ward-based political actors, traditional authorities where relevant, affected community groups, local businesses, transport operators, labour interests, prospective subcontractors and groups dependent on the road for access to schools, clinics, markets and public services.

This is particularly important where an upgrade crosses more than one ward, settlement, traditional authority or local economic constituency. In such cases, social volatility may arise less from opposition to the road itself than from perceived unfairness in the distribution of project benefits: which ward is prioritised, where works begin, who is employed, which subcontractors are used, how information is shared, and whether one group appears to capture opportunities at the expense of another. The PLC should therefore be required to produce, as part of project readiness, a stakeholder and veto-risk map showing the affected wards and settlements, the principal economic and social interests, the groups likely to be affected by construction disruption, and the actors whose exclusion could create implementation risk. The purpose is not to give any group control over technical design or lawful procurement, but to ensure that legitimate local interests are visible, heard and managed through an agreed process before construction begins.

The chairing and facilitation of the PLC is therefore critical. PLCs should be coordinated by a neutral, skilled chair who is independent of local ward competition and contractor interests, experienced in structured community facilitation, and able to manage discussions using focus-group principles. The chair or facilitation team should be fully fluent in the dominant local language, with translation support where more than one language group is materially affected. This is not a cosmetic requirement: in contested local environments, poor facilitation can allow stronger voices to dominate, silence women, young people or peripheral settlements, obscure ambiguous concerns, and convert manageable grievances into project stoppages. Qualitatively trained facilitators are better placed to elicit concerns systematically, clarify competing claims, distinguish representative concerns from opportunistic demands, and convert community inputs into a documented risk log that can be acted upon by the implementing authority. The relevant focus-group management and community facilitation skills are taught in organisational psychology, urban planning, and some marketing postgraduate programmes in South African universities; relevant skills are also sometimes taught to students of anthropology and sociology.

The PLC readiness package should include: (i) a representation register confirming that all material wards, community structures, economic interests and potential veto players have been included or formally invited; (ii) minutes of PLC meetings and sub-committee discussions; (iii) a social-volatility risk register covering employment, subcontracting, access disruption, sequencing of works, road safety and information-sharing risks; (iv) agreed communication protocols for project updates and grievance escalation; and (v) a record of issues that require action by the implementing authority, contractor or municipality before procurement or construction proceeds. For complex projects, the PLC should be supported by sub-committees covering community access, commercial activity, and procurement, labour and training issues. These sub-committees should report back to the full PLC and, where appropriate, to broader town-hall meetings.

The facility should include a dedicated PLC line-item within the pipeline support package, covering compensation for community participants' time through a simple, auditable stipend framework, procurement of experienced facilitators with focus-group capability, and language support, including translation in and out of the dominant community language and translation of core instruments where required. PLCs should be convened and their written recommendations, risk register and representation record produced as a prerequisite for a project to graduate into Year 2 of the pipeline, namely to proceed from preparation into procurement-ready design and packaging. The PLC deliverable should form part of the readiness gate documentation alongside the design package, whole-of-life comparison and procurement plan.

### 6.7 Enforcement and consequences management

Finally, the procurement regime must make performance valuable and non-performance costly. The URUF should apply a predictable set of consequences - time-bound remedial plans, withholding/retention, and stopping/reallocation - within the facility allocation itself, consistent with the conditional-grant enforcement mechanisms provided for in the Division of Revenue framework (Republic of South Africa, 2025). Transparent reporting and independent verification reduce discretion and strengthen the credibility of the facility within the MTEF.

## 7. Conclusion

We have argued that South Africa's persistent reliance on repeated regravelling and reactive repairs on unpaved roads and fixing of potholes on paved streets is not primarily a technical failure, but an institutional one. The current intergovernmental financing architecture is coherent for equity and basic maintenance preservation, yet it is structurally ill-suited to financing and delivering a pipeline of gravel-to-sealed upgrades at scale. Where benefits are diffuse and realised over long horizons - through service reliability, market

access, resilience, and lower recurrent liabilities - the budget holder facing the capital outlay does not capture the full return. In a fiscal federalism setting characterised by vertical fiscal imbalance, annual appropriations and uneven delivery capability, the predictable equilibrium is underinvestment in economically justified upgrades and over-reliance on short-horizon, visible maintenance activity.

The central policy implication is that priority unpaved road upgrading should be treated as national liability management, not as an optional sub-national add-on. The high upfront capital cost is best carried by the national fiscus because National Treasury captures a disproportionate share of the upside and bears a material share of the downside risk. Upgrading selected links can expand the national tax base through higher economic activity and labour mobility; reduce medium-term pressure on nationally financed maintenance envelopes by shifting corridors onto a lower and more predictable life-cycle maintenance path; and reduce contingent fiscal exposure to disaster response and emergency reinstatement as climate risks intensify. These channels do not imply that every gravel road should be sealed, but they do justify a rules-based national instrument that finances upgrades where life-cycle and service criteria are met.

To operationalise this logic, the paper proposes an Unpaved Roads Upgrade Facility (URUF): a conditional, multi-year capital instrument that finances upgrading priority unpaved roads to low-volume sealed road standards while hard-wiring maintenance performance, service levels and verification into the financing contract. The URUF's novelty is not that it "adds money", but that it aligns incentives and strengthens credibility through three design features: (i) disciplined project selection anchored in transparent life-cycle comparisons; (ii) stage-gated disbursement against a small set of verifiable deliverables, including retention released only after post-completion durability verification; and (iii) credible enforcement through withholding and stop/reallocation rules within the facility, coupled with an implementing-agent channel for jurisdictions that lack delivery capacity. In economic terms, the facility converts a dispersed, politically exposed and short-horizon decision into a repeatable mechanism that rewards durable serviceability rather than inputs or nominal expenditure.

We have also emphasised that financing reform and delivery reform are complements. Without standardised designs, repeatable procurement routes, fit-for-purpose contract packaging, and programme-funded technical support, additional capital will convert into weak pipelines and uneven quality rather than surfaced kilometres that remain serviceable. For this reason, the URUF is paired with a procurement and capacity-building regime that expands implementation throughput while protecting durability: framework-based procurement for standard solutions, geo-packaged projects that match market depth, enforceable subcontracting and contractor development models where appropriate, and a light but credible verification and transparency system to reduce discretion and limit quality failure modes.

A further binding constraint is the capitalisation and operational support of emerging contractors. Without reliable mechanisms for continuity of work, access to plant and inputs, and practical business support during the learning curve, contractor development objectives will remain aspirational and delivery will default to a small number of incumbents. The proposed CCF is therefore an integral complement to URUF delivery: it bridges a structural skills and capital shortfall while protecting budget discipline through rules-based governance, verification and transparency.

Two practical cautions follow. First, the URUF should not be evaluated on how much it spends, but on whether it measurably shifts the network onto a lower-cost, more resilient life-cycle pathway. This requires a small set of portfolio-level outcome indicators (delivered kilometres to standard, unit costs, post-defects road condition outcomes and routine preservation execution) reported transparently. Second, the facility should be deliberately selective: the economic case for sealing depends on traffic, materials, drainage and maintenance execution risk, and not all roads will meet the threshold. Where a sealed solution is not cost-

effective, the appropriate response is to strengthen gravel road preservation and drainage resilience, not to pursue upgrading for its own sake.

A feasible implementation pathway is therefore to begin with a controlled pilot over one MTEF cycle, using stable rules and robust verification rather than experimentation with complex indicators. Drawing on lessons from the TRH24 process, the pilot design should explicitly budget for implementation elements that are routinely overlooked - most importantly before-and-after assessment fieldwork led by economists to credibly quantify impacts. In practice, this implies incorporating a “Year 0” package within the three-year pipeline for baseline (pre-upgrade) data collection and evaluation design, followed by a Year 3 window for post-upgrade follow-up measurement. The pilot should also test: (i) whether the stage-gate model improves readiness and reduces procurement delays; (ii) whether retention and post-completion verification measurably improve durability; (iii) whether implementing-agent arrangements materially raise delivery in low-capacity municipalities; and (iv) whether the facility’s discipline yields credible evidence of reduced recurrent maintenance and emergency intervention needs on treated corridors. If these conditions hold, the URUF can then be scaled as a national platform for upgrading the subset of the unpaved network where sealing is genuinely the least-cost and most resilient service solution.

In summary, we recommend a shift from ad hoc upgrading to a rules-based national financing pathway that internalises spillovers, strengthens incentives for durability and maintenance, and makes delivery feasible within South Africa’s existing PFM and procurement architecture. Done well, the reform offers a fiscally responsible way to expand reliable access to basic services and support economic activity while reducing the recurrent and contingent liabilities that currently trap the system in a costly cycle of regravelling and repair.

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