SOIL STABILSER INTRODUCTION

Using SOIL STABILISER to improve conditions in COUNTRY X

PLEASE NOTE-THIS CAN BE DONE FOR ANY COUNTRY OR LOCATION AS REQUESTED.

SOIL STABILISER is one of the best, if not the best way to jump start stagnant economic areas by providing roads, water, jobs, food and income to many in a short period of time at relatively low cost. At the same time it widens the government's tax base directly and indirectly to recover the money spent on the once off initial establishment investment over and over for decades. Large scale donors and development agencies similarly achieve their purposes.

We must harness and use what we have more effectively with innovation. SOIL STABILISER was invented and engineered to profitably improve conditions for all with what we have here in Africa. SOIL STABILISER can often use on site soils (or imported from nearby) to construct or repair roads. This makes travel on better and safer roads possible with reduced vehicle operating costs and medical bills while creating more jobs and income for the unemployed to construct and maintain the roads.

COUNTRY X has XXXkm2 (XXXbillion m2) of land area and an annual rainfall of XXXm/m2 i.e. XXX billion m3 water p.a. XXX trillion litres of safe, clean, free water fall on COUNTRY X each year and most of it is not directly used. SOIL STABILISER can harvest and store it where it falls and convey it at low cost.

This water can reduce the effects of climate change, bridge dry spells and droughts and maintain crop yields in dry spells and keep livestock alive in droughts.

This water can harness the major forces of nature at low or no cost. SOIL STABILISER uses the abundant soil which costs nothing or very little that is already on or near the site. Farmers and plants then use the valuable free plant food in that soil. SOIL STABILISER channels use gravity to move the water to where needed for free. Seeds make new grass, new seeds, crops and new baby chicks and cows at no or low cost. Clean safe water reduces or prevents water borne diseases and reduces medical bills. Improved nutrition with more vegetables, eggs, meat and fruit improves health and reduce medical bills. The free sunshine and wind can then be used by many who can then afford it to provide light, learning, and heat and charge cell phones that provide communication, information and banking.

This introduces the benefits of IT into rural Africa with accelerated training, knowledge and productivity.

Rural people can with water provide their own jobs, food and income with the above and eat, trade and prosper if they work at it. This and adjacent value chains are sustainable and can afford IT and many other benefits and an improved standard of living. Without water it all dies or goes away.

SOIL STABILISER can significantly help to improve all 17 of the United Nation's SDGs (Sustainable Development Goals) like no poverty, zero hunger, etc. It can enable rural people (and next to townships) to create their own jobs, food and income with relatively small jump start inputs to establish and train from government.

Innovation is needed to speed up job creation and SOIL STABILISER has developed 150 innovations that can help to do so. Focus is needed and the following SOIL STABILISER products can be used:

COSTS REDUCTION-BETWEEN 25-40% ON ALL APPLLICATIONS

SURFACED ROADS

Major Roads

1. SOIL STABILISER reinforces bitumen to attain the same strength as cement stabilization but is flexible, not brittle. Unlike cement SOIL STABILISER can bend and return without cracking under loads to a large degree. It can therefore be used in a pavement structure directly under or closer to the asphalt surface for a durable solution at lower cost.
2. Many roads in SA are already constructed and 80% of SA's road budgets will be spent in future on maintaining the existing road infrastructure. SOIL STABILISER **BituForce** is often superior to alternatives as it can be milled in from above with a recycler.
3. **This is faster and costs are reduced as the in situ materials can often be used, reinforced and covered with a new asphalt or bitumen seal surface. SOIL STABILISER was used to stabilize the six lanes of William Nichol Rd. (160 000 vehicles per day) next to the N1 in Sandton, Johannesburg, with no traffic disruption during weekdays and very little disruption over only three weekends, recycling the existing surface materials with SOIL STABILISER on the first day and adding a new asphalt seal the next day. Traffic lanes were opened again on the Mondays.**
4. SOIL STABILISER's strength, exceptional water resistance and flexibility makes SOIL STABILISER superior for use in bases (and sub-bases if required) in many surfaced low volume roads providing durable township and other low volume roads at low cost.
5. An SOIL STABILISER stabilized base at Eskom Duvha power station has now carried more than 50 million ES80 axle loads since 1996 and is still in excellent condition. SOIL STABILISER is strong, flexible and very water resistant and can carry the load.
6. SOIL STABILISER township roads can use thin durable bitumen seals because of the good support from the strong, flexible and very water resistant SOIL STABILISER base. More roads can be constructed from the same budget while more people can be employed.

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LOWER VOLUME ROADS

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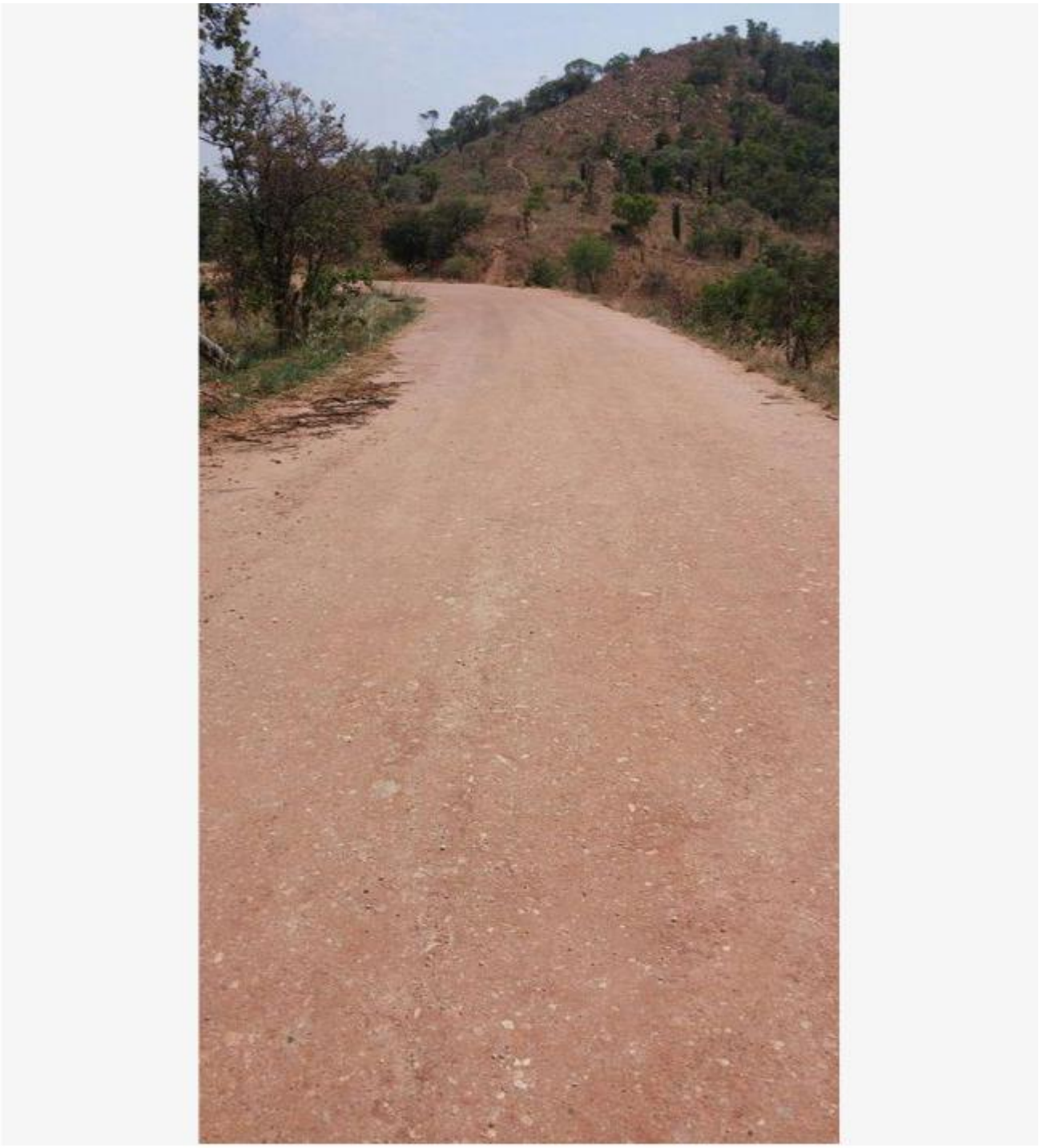

1. SOIL STABILISER **DuraGrav** can halve the maintenance costs of SA's gravel road network. Add SOIL STABILISER into the water truck during re-graveling, level, compact and spray. This incurs almost no extra construction costs and the wearing course can last twice as long as an untreated surface with occasional re-sprays maintenance and no grading.
2. The improved cohesion reduces erosion, dust and skidding, requires fewer borrow pits and reduces carbon emissions and costs. Road users get a much improved and safer driving surface as a bonus.
3. Construction is easy and similar to re-gravelling and can create many more jobs. Simply add SOIL STABILISER into the water spray truck during re-gravelling.

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MINES

Additional Information

- SOIL STABILISER **SprayOn** controls dust effectively at low cost. Spray SOIL STABILISER/ water solution twice instead of water 28 times per week saving water, vehicle operating costs and allowing haulage trucks to operate faster. SOIL STABILISER reacts chemically with the soil strengthening the surface, reducing erosion and dust effectively. SOIL STABILISER does not leach out and builds up cumulatively with each respray reducing future spray costs.
- Mixed-in SOIL STABILISER **DuraGrav**mine haul roads are more durable and need fewer maintenance sprays at lower cost.

COSTS REDUCTION-BETWEEN 25-40% ON ALL APPLLICATIONS

- SOIL STABILISER containment technology and water applications reduce the cost of mine closures while providing sustainable long term solutions to communities. SOIL STABILISER membranes keep imported clean soils separate from polluted soils and SOIL STABILISER rainwater harvesting provides communities with cleaner water for farming and if purified for drinking.

RAIN WATER HARVESTING

1. S.A. receives 500 trillion litres of rain per year but very little is directly used. Harvest rain where it falls by spraying SOIL STABILISER onto a cleared slope. The rainwater then does not penetrate into the soil but runs off lower down.
2. Store this water in an SOIL STABILISER lined pond or guide it with SOIL STABILISER treated channels to crops or livestock or rivers and dams which then fill sooner (e.g. for Cape Town drought spray road shoulders, etc. above existing drainage systems.)
3. Catching the rain where it falls enables rural families and unemployed persons in townships to create their own jobs, food and income. This makes land in arid and normal areas more usable, profitable and more valuable.

WASTE WATER TREATMENT

COSTS REDUCTION-BETWEEN 25-40% ON ALL APPLLICATIONS

1. 80% of all sewage in the world is untreated because of the high cost of treating it. SOIL STABILISER in situ soil treated ponds can help to relieve this huge problem.
2. Evaporation ponds at mines can cost less using SOIL STABILISER pond linings.
3. SOIL STABILISER containment technology can confine pollutants until treated.

SOIL STABILISER MEMBRANES

COSTS REDUCTION-BETWEEN 25-40% ON ALL APPLLICATIONS

1. Reduce or eliminate the biggest risk of farming – dry spells and droughts - which can decimate yields from crops or livestock farming. Spray SOIL STABILISER onto a cleared slope to let the rainwater run-off and not penetrate into the soil (most soft rain presently goes into soft soil.) Then remove say 400mm soil lower than this harvest area to one side and treat the exposed surface with an SOIL STABILISER membrane. Replace the soil and plant the crops. Rainwater then seeps down through the soil near the roots above this membrane with very little evaporation. Moisture stays near the roots that cannot use it if seeps too far down. This membrane keeps salts in brackish areas below the membrane to not affect crop yields. Livestock and people's digestive systems are also badly affected by too much salt instead of sweet rainwater.
2. These SOIL STABILISER systems allow farming with very little water which makes sustainable and profitable farming possible with consistent water in normal and even dry areas.
3. This counters climate change and can reduce or reverse migration to cities and can allow many to create their own jobs, food and income and prosper, also indirectly in adjacent value chains.

OTHER USES

SOIL STABILISER can provide many other benefits of strong, water resistant soil. It can help to control erosion, mud, vegetation, evaporation, fire damage to fences or properties, dust, temperature, moisture, pollutants, insulation, etc. It can stabilize fence posts, wetlands, embankments, support foundations, paths, road shoulders, potholes, parking lots, hard stands and make bricks, blocks, tiles, mortar, plaster, floors, cast walls, etc. and many more.

7.2 One can engineer with what we often have for free or at low cost in front of us: soil (including the plant food in topsoil), rain, gravity, labour, seeds in nature and for farming, livestock breeding, sun, wind, etc. and sustainably improve conditions like health and wealth for many directly and indirectly. This increases income to voters and taxes to governments providing an excellent return for decades in future. SOIL STABILISER can significantly improve all 17 Sustainable Development Goals of the United Nations.

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SOIL STABILISER has been certified by Agrement SA and has acquired patent rights in various countries.

Better Gravel Roads

Gravel roads are a very expensive road system. Dust and weathering result in material loss and is an unsustainable practice.
SOIL STABILISER Wearing Courses stabilize the top layer to about C3 or C2 (UCS/ITS and A19/Sil. Carbide aggregate loss) standards to provide a durable water resistant wearing course that reduces aggregate loss occurring due to traffic and environmental weathering creating an ultra-slow wearing course.
Wearing can be predicted based on comparing abrasion and erosion tests to untreated samples, structural layer durability should be determined as per established cemented base course systems. This can also be used in labour intensive erosion control for example on road shoulders to reduce water ingress into the pavement structures and to reduce edge breaks/aggregate loss. Labour intensive construction makes relatively thin layers possible to construct (e.g. 30mm-75mm).

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Labour Intensive Paths and Road Shoulders

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Construction of road shoulders, paths and side-walks creates employment.

Hard shoulders are an integral part of all roads and are often neglected especially in rural areas. In secondary roads only the minimum road width is provided and with the increase of mining vehicles and traffic on these roads the edges of the roads deteriorate quickly.

The road edges deteriorate further due to;

- Light Vehicle Traffic leaving the road at drop-off/collection points.
- Erosion of soil due to surface water (rain) especially on the downhill side of the road.
- Damage due to loading by heavy vehicles on the unsupported edges (dominant at intersections where traffic often leaves the road to avoid stationary or slow turning vehicles.)
- Encroachment of plants.

Edge breaks and drop-off have caused many accidents where a vehicle travelling on the hard shoulder tries to return to the road and loses control as steering is affected by the ridge.

Importing material to repair erosion is not viable for most municipal entities and will erode again and thus is not sustainable.

Constructing road shoulders from SOIL STABILISER resolves this problem and has many benefits:

- Roads are safer without edge-breaks and drop-offs.
- Roads last longer as moisture permeation is reduced from road side into the sublayers.
- Reduces vegetation growth encroaching (visibility/moisture/edge-breaks/maintenance costs).
- Prevents or reduces damage to black-top seal and base by heavy trucks driving next to edge-breaks/on wet sublayers.

COSTS REDUCTION-BETWEEN 25-40% ON ALL APPLLICATIONS

- It can create many jobs
- is strong and durable
- is very water resistant
- is economical in thin layers of 30mm to 75mm or more (supported by compacted sub layers.)
- it significantly reduces road maintenance costs.

Sidewalks and bicycle or foot paths can similarly be constructed labour intensively to create many more jobs in rural or urban areas. Skills taught can be certified and trained workers can start their own franchised SOIL STABILISER businesses or help construct rural or township SOIL STABILISER paths, roads, ponds, etc..

Mining haulage costs improve with SOIL STABILISER

Haul roads are plagued with safety, dust and maintenance problems but a well engineered road can solve these problems and improve productivity.

Many studies have been done on haul road efficiency in recent years and show that a good driving surface pays for itself in terms of time saved and vehicle operating cost.

Conventional road construction methods are well established and work well and SOIL STABILISER improves on these strengths. SOIL STABILISER has been used successfully to construct heavy duty haul roads while reducing capital expenditure at the same time.

Your existing gravel road could be upgraded to an SOIL STABILISER road thereby improving travelling times of vehicles and increasing output. The improved driving surface reduces fuel expenses and maintenance.

COSTS REDUCTION-BETWEEN 25-40% ON ALL APPLLICATIONS

SOIL STABILISER haul road for a nearby colli

SOIL STABILISER SprayOn

MINE DUMPS, MINING AREAS, MINING SURFACES OF YARD, ROADS, ETC.

An SOIL STABILISER SprayOn reduces dust and improves water resistance of roads and material dumps such as ash heaps at power stations or mine waste material.

SOIL STABILISER SprayOn chemicals are mixed with water in a spray truck and sprayed onto the aggregate surface. As the SOIL STABILISER is initially water soluble it permeates into the soil, the water then evaporates as the SOIL STABILISER hardens and a plastic-like layer is left behind in the surface. This binds the small dust particles to each other and also to the larger particles.

Water is used to transport the chemicals into the soil e.g. 4ℓ/m_2 (litre/square meter) sprayed permeates 30mm deep and the penetration depth can be adjusted as required by using more or less water to permeate chemicals deeper into soil. Maintenance sprays are done at regular intervals or as needed depending on traffic volumes or type of application.

The SOIL STABILISER SprayOn has several unique advantages:

- It is initially water soluble and goes where the water goes into the soil. It then reacts chemically to becoming water insoluble where other products remain water soluble. It is easy and cheap to apply and does not wash away like water soluble products when it rains. This reduces re-spray costs dramatically.
- As it is initially dissolved in the water it permeates into the weak, dusty patches much more than into the the strong, hard patches that do not need strength or do not make much dust. This further reduces the cost because the product is automatically dispersed to where it is needed most and economically provides a consistently stronger surface.
- If the aggregate contains approximately 66% stone and 33% fines the stones do not need strengthening and the say 2% SOIL STABILISER dosage/water solution then permeates into the fines effectively becomes 6% dosage in the fines (much stronger than 2% but cheaper than 6% overall dosage), saving money on chemical purchases.
- Re-sprays only have to be done on worn parts of the road or patches and less often. This further saves a considerable amount of money. (e.g. only 20% of entire road surface re-sprayed is 80% cheaper than the initial spray and it is done much less frequently.)

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- Re-sprays penetrate much less than the initial spray as much of the previously sprayed chemicals still are present and water insoluble. (e.g. it only permeates 10mm into initial 30mm penetration. i.e. a further 66% cheaper than the first spray.)
- The dosage rate of re-sprays is usually lower than the initial spray, e.g. 1% instead of 3% (66% cheaper.)
- As the SOIL STABILISER SprayOn strengthens the fines between the stones (in aggregates containing stones) truck tyres drive mostly on the stones that do not make much dust while the stones protect the SOIL STABILISER strengthened fines between and under the stones, providing a stronger and more durable road surface with less or almost no dust.

The above SOIL STABILISER SprayOn benefits provide effective dust prevention at low cost.

SOIL STABILISER SprayOn dust control in Swaziland.

1 **SOIL STABILISER BituForce for bases and sub-layers of surfaced (tarred) roads.**
2 **SOIL STABILISER Pothole fix to repair and worn surfaced roads.**
3 **SOIL STABILISER DuraGrav to make gravel roads stronger and more durable at lower cost.**
4 **SOIL STABILISER SprayOns to maintain gravel road surfaces and control dust and erosion.**
5 **SOIL STABILISER PondLiner to store water and convey water in channels.**
6 **SOIL STABILISER EnviroKleen to treat waste water or evaporation ponds for industry and mines.**

COSTS REDUCTION-BETWEEN 25-40%
ON ALL APPLLICATIONS

BATCH POT HOLES

- **3.7 TONS OF SOIL STABILISER**

REPAIR 3608 POTHOLES APPROXIMATELY MEASURING=

0.5m x 1m = 0.5m2 x 100mm deep TO 1m x 1m = 1m2 x 0.1m deep = 0.1m3

NUMBER OF POTHOLES WILL DEPEND ON THE SIZE IN CONCERN.

THERE IS A FORMULA FOR IT ONCE THERE IS INTEREST.

- **CONSTRUCTS 900 Metres X 3 METER WIDE ROAD GRAVEL ROAD.**

SOME OF THE USES

- **FIRE GUARDS**
- **CANALS**
- **PONDS**
- **HARD STANDS**
- **DUST PROOFING**
- **HARD STANDS**
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