

PRINGLE BAY



RATEPAYERS

# **PRINGLE BAY GRAVEL STREETS**

## **CONDITION SURVEY AND RESULTS**

AUGUST 2020  
(REV 3)

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## **LIST OF ABBREVIATIONS and DEFINITIONS**

CSIR	Council for Scientific and Industrial Research
OM	Overstrand Municipality
PAVEMENT	In the context of this document “Pavement” refers to the structural composition of a gravel street, more specifically describing the type and extent of the various layers below the surface of a gravel street. It does not refer to the “sidewalk” which is located next to the street.
PBGSCS	Pringle Bay Gravel Street Condition Survey
PBGSPMS	Pringle Bay Gravel Street Pavement Management System
PBRA	Pringle Bay Ratepayers Association
PBSW	Pringle Bay Street Watch

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- 1) Pringle Bay Street Watch in particular the Sector Heads.
- 2) Me. CM Vorster whom on a Pro Bono basis, kindly assisted in developing the Electronic Input Form.

## 1. BACKGROUND

The Pringle Bay Ratepayers Association (PBRA), as one of their strategic objectives, reached out to the Overstrand Municipality (OM) to offer expertise, capacity and assistance where possible and where and when required.

Following a meeting between PBRA representatives and OM Officials on 5 March 2020, amongst others, the OM Maintenance Program for the upkeep of the gravel streets in Pringle Bay was jointly identified as one of the key responsibility areas of the OM where significant and valuable input and assistance from the Pringle Bay community could be offered.

PBRA subsequently offered to assist in undertaking a condition survey of the gravel streets in Pringle Bay with a view to prioritise the streets requiring attention of some sort to ensure acceptable trafficability and driver comfort.

The OM Municipal Area Manager and his assistant responsible for roads and streets in Pringle Bay accepted the offer.

The PBRA proceeded to compile a project framework and methodology to guide a project team to perform the condition survey. It was decided to make use of the Pringle Bay Street Watch (PBSW) Sector Heads to assist in the survey focusing on the streets in their respective Street Watch Sectors. Six field workers were sourced to assist with data capturing.

A Field Survey Manual was compiled to assist and guide field workers when performing the Pringle Bay Gravel Street Condition Survey (PBGSCS). The Condition Survey is entirely based on the visual assessment and driving comfort of a street taking cognisance of a number of gravel street design and construction criteria. (Refer to [Annexure A](#)).

Based on the Field Survey Manual, a data capturing Survey Form was designed (Refer to [Annexure B](#)).

To streamline the data capturing exercise, a real-time on-line data capturing input form was developed which field workers could access via a tablet or a mobile phone while on the move. Data capturing thus became available to the project manager in real time to analyse and verify the input received from the field workers (refer to [Annexure C](#) for a description of the electronic input form).

The data was analysed and an Condition Index was determined which was used to determine the required level of maintenance applicable to the particular section of street.

The approach, methodology, analysis and results of the Condition Survey are discussed in the following paragraphs.

## 2. INTRODUCTION

Gravel roads as implemented in Pringle Bay, have the following purposes:

- a) To ensure safe and reliable access to properties and facilities, not only by the general public but also, and equally important, by emergency services;
- b) To ensure mobility at a speed not exceeding 40km/h.
- c) To create a Country style or rural type atmosphere, something the majority of residence cherish and consider to be one of the main reason for settling in Pringle Bay.

Gravel streets are thus an important element defining the character of Pringle Bay and should be protected and treated with the necessary attention and respect.

Gravel streets (or for that matter any street or road) have several important aspects that define the functional efficiency thereof. These are, amongst others, the following:

- **Riding quality:** primarily defined by the condition of the road surface (driver comfort).
- **Dust pollution:** primarily defined by the composition of the wearing course and design speed of the street.
- **Traffic Safety:** primarily defined by the alignment of the road including safe stop-sight-distances.
- **Road-side Furniture:** primarily defined by the presence of pedestrian facilities (sidewalks) and traffic signs.
- **Stormwater drainage:** primarily defined by the presence of formal drainage structures and the shape of the street.

Collectively the above-mentioned aspects are inter-dependant in defining the functional efficiency of the road. Ensuring that one of these is at all times in accordance with expectations but ignoring or neglecting the others or only one of the remaining ones, will, without doubt, cause the street to fail in terms of functional efficiency. Maintaining the one is as important as maintaining the other.

This initiative however addresses only one of the above-mentioned aspects, namely **Riding quality**. The other aspects will be addressed with the same vigour and interest in the weeks and months to come.

The Approach to and Methodology followed with the Pringle Bay Gravel Street Condition Survey and the subsequent analysis if data, are discussed in the following paragraphs.

### 2.1. Survey Approach

The condition of streets in Pringle Bay, although judged to be generally in an acceptable condition, is often criticised by residents as being poor, blaming the OM of negligence and ignorance, in some cases justifiable but mostly not justifiable. Purely because these

accusations are mostly based on emotional outcries and perception rather than science and fact. The former is not quantifiable whereas the latter is quantifiable.

It is thus important to steer away from emotion and perception and to rather focus on gravel street performance criteria through evaluating applicable design and construction parameters within a scientifically based framework.

The Transportec division of the Council for Scientific and Industrial Research (CSIR) in the year 2000 compiled a document titled "*Draft TMH12: Pavement Management Systems: Standard Visual Assessment: Manual for Unsealed Roads Version 1*", which was used as basis for the compilation of the "PRINGLE BAY GRAVEL STREET CONDITION SURVEY: A PRACTICAL MANUAL".

The Field Workers studied the Manual prior to engaging in executing the survey. The Field Workers were continuously guided and assisted by the Project Manager (a qualified Professional Civil, Traffic & Transportation Engineer) to, as far as practically possible, ensure consistency in interpretation of the visual assessments of the parameter's particular condition.

It was planned to undertake several dry runs with the Field Workers team to ensure consistent interpretation of the evaluation criteria prior to performing the actual surveys. However, the event of COVID-19 and the associated Lockdown that commenced end of March 2020 and which is still enforced albeit at a different level, made it illegal for people to be outside their residences and furthermore to congregate or work in a group. Consistency in interpretation thus largely depends on the Project Managers guidance and photographic evidence/examples to individual Field Workers' enquiry or them expressing uncertainty of a particular situation. The outcome of this approach yielded surprisingly consistent results.

Given the limitations imposed by COVID-19 on the free movement of people, the surveys could actually only commenced during June 2020. The five Field Workers were briefed by the Project Manager on using the "App" (nothing more than an electronic data capturing form accessible from any mobile or tablet) to capture field data. Once they were familiar with and comfortable using the "App", and bearing in mind the arrival of our annual rain and storm season, surveying started in all earnest mid-June and was completed early July 2020.

Field Workers performed the survey by logging the condition (degree) of several parameters while driving along the various streets. In some instances data capturing were also performed while walking along the streets.

Captured Data became visible to the Project Manager in real time as and when it was captured, making it possible to telephonically discuss some inputs when considered necessary. Adjustments and/or corrections could then be performed immediately, thus effectively eliminating inconsistency and the necessity of re-runs of certain sections of street.

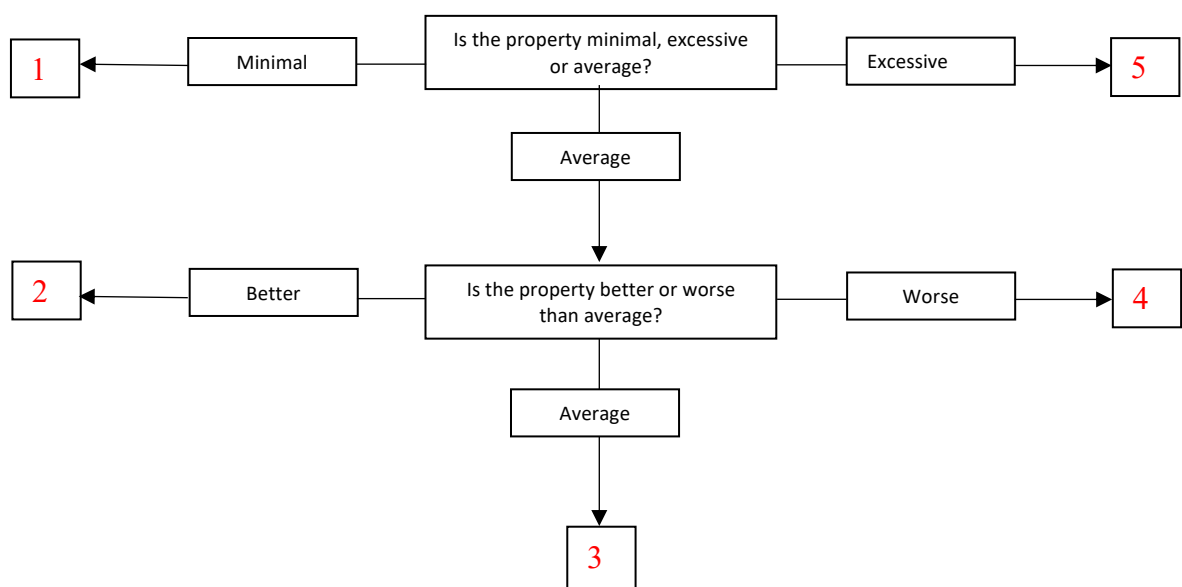
## 2.2. Survey Methodology

As was mentioned earlier, the principle of “Science and Fact” is preferred to “emotion and perception”. Based in the referenced CSIR’s Draft TMH-12 document, a **Level 1** visual survey is adopted to gather the required data to ultimately classify the condition of the gravel streets. It is the very most basic approach to a survey conforming to scientific and factual methodologies.

The following parameters/characteristics are considered in evaluating the condition of the streets based on the **visual** assessment of same:

- General performance
- Moisture condition
- Gravel quantity/layer thickness
- Road profile/shape as an assessment of water shedding capacity
- Road drainage in terms of removal of water from the road surface
- Road drainage in terms of accepting water from elsewhere and drained along the road
- Riding quality and influencing factors
- Dust
- Trafficability
- Isolated problems

These characteristics are judged in terms of a five point classification systems based on the following flow diagram:



**FIGURE 1: Flow diagram – five point classification system**

For more detail and description of the above-mentioned methodology, please refer to [Annexure A & B](#).

Field Workers were guided to identify sections on a street with particular collective good or poor performing characteristics allowing a street to be segmented in terms of

the conditions thereof. Due to the absence of chainage markers along streets, it was decided to use Street Numbers as the reference points to define sections along a street (Refer to Annexure D: Pringle Bay Street Map). For purposes of defining the sections, all streets were considered to be one-way streets, thus defining a section from an even street number to an uneven street number is no different than defining the same section from an even number to an even number or alternatively an uneven number to an uneven number.

Field workers used the electronic input form accessible from any mobile or tablet to capture data by judging the degree of all the parameters/characteristics listed above (refer to Annexure A for definition of “Degree”).

The condition for the street section is then defined by the Condition Index which is calculated as the cumulative sum of the degrees allocated to each of the characteristics. The streets are then, according to the Condition Index, categorised to be in the **Slight, Warning** or **Severe zones** of maintenance requirements. These categories are then classified in accordance with the suggested Maintenance requirements as either requiring **Routine Maintenance, Corrective Maintenance or Rehabilitation**. Refer to paragraph 5 for a description of the interpretation of the results.

Finally, for each Maintenance Requirement, streets are **prioritised** from High to the Low taking into consideration ONLY the Condition Index score. It remains the prerogative of the OM Officials to also consider social aspects such as the number of households served by the particular street and the importance thereof in a broader mobility sense.

The results are discussed in Paragraph 5.

### 3. SURVEY

The actual survey started on 17 June 2020 and was concluded on 6 July 2020. Some streets were surveyed during dry conditions and some were surveyed while wet conditions prevailed.

Each Field Worker has a clearly demarcated area to survey.

Once a Field Worker has completed his survey, the Project Manager went out to that area to perform spot checks with a view to make sure that consistency across areas prevail. Very little tweaking was required, the raw data showed a very good correlation in the interpretation of adjudicating the degrees of the various characteristics.

The data will continue to be updated after 6 July 2020. This will allow us to monitor implementation of proposed remedial measures as well as to monitor the performance of improvements over time. It will also signal the deterioration of streets over time.

The intention is to submit to the OM on a quarterly basis updated Condition Indices for each street thus providing the OM with valuable planning data and information.

In total, 131 records were captured representing 77 streets across eight Street Watch sectors.

## 4. RESULTS

The results of the survey can be presented as follows:

- a) Per Street Watch Sector (generally also related to each Field Worker)
- b) Per Street showing the various sections along the street.
- c) Per Maintenance Category (Routine, Corrective or Rehabilitation).
- d) Priorities per Maintenance Category.

For purposes of visual presentation, the Maintenance categories are also shown on the Pringle Bay Street Map (Refer to Annexure E: Pringle Bay Gravel Street Maintenance Requirements).

### 4.1. Interpretation of Results

Based on the criteria described in paragraph 2.2, the worst condition of a street results in an Index Score of 58, representing 100%.

Streets with an Index Score less than 24 ( $\pm 40\%$ ) are considered to be in good condition and requires only scheduled **Routine Maintenance**.

Streets with an Index Score of more than 38 ( $\pm 66\%$ ) are considered to be in a poor condition and requires substantial **Rehabilitation** works.

Streets with an Index score between 24 and 38 are considered to be in need of urgent **Corrective Maintenance** otherwise they will soon enter the Rehabilitation Zone

### 4.2. Maintenance Measures

**Routine Maintenance** as defined above is suggested to consist of scheduled grading (or surface treatment) to improve riding quality including patching of potholes and ruts. It is expected that limited material importation is required. If Routine Maintenance is not performed in accordance with the requirements of the Gravel Street Pavement Management System's criteria, the street will rapidly deteriorate to a point where Corrective Maintenance or even Rehabilitation measures will be the only remedy to save the asset and ensure "fit for purpose" functionality.

**Corrective Maintenance** as defined above is suggested to consist of importing material to re-construct a new wearing course of about 150 mm of compacted selected gravel, including appropriate shaping to achieve a 4% crossfall with a well-defined crown ensuring proper drainage from the road surface. Maintenance and/or upgrading of longitudinal drainage structures forms an essential part of Corrective Maintenance.

**Rehabilitation** as defined above is suggested to consist of major road improvement works including vertical re-alignment to accommodate storm water runoff, the provision of appropriate longitudinal drainage structures, associated imported wearing course selected material, shaping to achieve a 4% crossfall with a well-defined crown ensuring proper drainage from the road surface.

In order to ensure maximum value for money, streets that are identified for dust pollution control, are excluded from the gravel street lists as are roads that already are categorised as sealed roads such as Buffels and Central Roads for instance. Streets identified for dust pollution control are mainly streets leading to or serving public areas such as parking areas at beach accesses or streets in and around the business area of Pringle Bay.

The survey results can be summarised as following:

- a) From the 144 recorded street sections, 12 street section are categorised as requiring Rehabilitation (refer to Table 1).
- b) From the 144 recorded street sections, 83 street section are categorised as requiring Corrective Maintenance (refer to Table 2).
- c) From the 144 recorded street sections, 44 street section are categorised as requiring Routine Maintenance (refer to Table 3).
- d) From the 144 recorded street sections, 5 street section are categorised as streets requiring Dust Pollution Control (refer to Table 4).



## 5. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the following streets, in order of degree of deterioration, taking cognisance of ONLY the Condition Index, requires urgent attention. The priorities are:

### PRINGE BAY GRAVEL STREET CONDITION SURVEY RESULTS STREETS REQUIRING REHABILITATION

Priority	Assessment Date	Street Name	From Street number:	To Street Number	Index	Score	Factors	Length (m)
1	6/19/2020 11:02:10	Elizabeth Road	1	14	44	75.90%	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion	223
2	6/20/2020 13:54:52	Midway Street	1	4	42	72.40%	Loose Material, Stoniness, Potholes, Erosion	127
3	6/22/2020 14:31:15	High Level Road	9	1	42	72.40%	Stoniness, Ruts, Erosion	266
4	6/24/2020 12:02:18	Zandra Road	1	3	41	70.70%	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion	138
5	6/19/2020 10:59:59	Ursula Road	3	8	40	69.00%	Potholes, Ruts, Erosion	123
6	7/2/2020 13:20:20	Dennys Road	1	34	40	69.00%	Loose Material, Stoniness, Potholes, Ruts, Erosion	441
7	6/18/2020 15:09:08	Elizabeth Road	14	51	39	67.20%	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion	385
8	7/3/2020 16:40:55	Carla Road	35	57	39	67.20%	Potholes, Ruts, Erosion	179
9	7/3/2020 17:12:35	Gerald Road	23	34	39	67.20%	Ruts, Erosion	194
10	7/5/2020 16:27:26	Hilton Circle	1	33	39	67.20%	Stoniness, Potholes, Erosion	364
11	7/5/2020 16:37:36	Hilton Circle	53	83	39	67.20%	Stoniness, Potholes, Erosion	385
12	7/5/2020 16:45:13	Hilda Circle	17	20	39	67.20%	Potholes, Ruts, Erosion	195

TABLE 1: Streets requiring REHABILITATION  
(in order of priority based ONLY on Condition Index: 13 from 13 records)

### PRINGE BAY GRAVEL STREET CONDITION SURVEY RESULTS STREETS REQUIRING CORRECTIVE MAINTENANCE (first approximate 4km)

Priority	Assessment Date	Street Name	From Street number:	To Street Number	Index	Score	Factors	Length (m)
1	6/22/2020 14:47:46	Clarence Road	20	38	38	65.50%	Corrugation, Potholes, Erosion	514
2	7/3/2020 17:20:00	Oliver Road	1	17	38	65.50%	Potholes, Erosion	220
3	7/3/2020 17:36:33	Gully Road	1	9	38	65.50%	Stoniness, Potholes, Erosion	280
4	7/5/2020 15:33:50	Jally Road	39	43	38	65.50%	Stoniness, Potholes, Erosion	191
5	6/22/2020 14:04:19	Beach View Road	2	7	37	63.80%	Stoniness, Potholes, Erosion	234
6	7/2/2020 13:24:26	Diane Road	1	12	37	63.80%	Potholes, Ruts, Erosion	170
7	6/18/2020 14:28:45	George Road	69	1	36	62.10%	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion	761
8	6/19/2020 10:58:10	George Road	64	71	36	62.10%	Potholes, Ruts, Erosion	Incl in 7
9	6/20/2020 14:09:16	High Level Road	43	59	36	62.10%	Corrugation, Stoniness, Potholes	290
10	6/27/2020 11:59:13	Bobbie Road	2	4	36	62.10%	Potholes	119
11	7/3/2020 16:45:54	Glen Road	1	6	36	62.10%	Ruts, Erosion	70
12	7/3/2020 16:57:01	Denise Road	1	6	36	62.10%	Stoniness, Erosion	71
13	7/5/2020 15:36:18	Susan Road	31	23	36	62.10%	Stoniness, Potholes, Ruts, Erosion	154
14	7/5/2020 15:53:58	Jally Road	2	6	36	62.10%	Stoniness, Potholes, Erosion	75
15	6/18/2020 15:40:37	Rita Road	1	2	35	60.30%	Loose Material, Stoniness, Potholes, Erosion	40
16	7/2/2020 13:22:37	Dennys Road	39	51	35	60.30%	Potholes, Erosion	96
17	7/3/2020 17:06:47	Oliver Road	16	26	35	60.30%	Ruts, Erosion	153
18	7/5/2020 16:34:16	Hilton Circle	41	53	34	58.60%	Potholes, Erosion	155
19	6/17/2020 16:52:09	Albatross Road	26	42	33	56.90%	Potholes	320
20	7/3/2020 16:36:18	Carla Road	15	29	33	56.90%	Stoniness, Potholes, Erosion	178
21	7/3/2020 17:14:15	Gerald Road	34	40	33	56.90%	Stoniness, Ruts, Erosion	86
<b>TOTAL</b>								<b>4174</b>

TABLE 2: Streets requiring CORRECTIVE MAINTENANCE  
(in order of priority based ONLY on Condition Index: 10 from 91 records)

## PRINGE BAY GRAVEL STREET CONDITION SURVEY RESULTS

### STREETS REQUIRING ROUTINE MAINTENANCE

Priority	Assessment Date	Street Name	From Street number:	To Street Number	Index	Score	Factors
1	6/17/2020 16:47:06	Marine Drive	1	13	22	37.90%	Potholes
2	6/22/2020 14:07:01	Beach View Road	7	13	22	37.90%	Stoniness
3	6/23/2020 16:17:11	Threeways Road	2	28	22	37.90%	Stoniness, Potholes, Erosion
4	6/23/2020 16:20:57	Threeways Road	16	16	22	37.90%	Stoniness, Erosion
5	7/2/2020 13:27:44	Henry Street	1	2	22	37.90%	Potholes
6	6/18/2020 15:12:05	Albatross Road	1	12	21	36.20%	Potholes
7	6/22/2020 14:49:55	Clarence Road	38	46	21	36.20%	Stoniness
8	6/23/2020 16:34:24	Stream Road	16	18	21	36.20%	Erosion
9	7/5/2020 16:08:56	Boundary Road	20	40	21	36.20%	Potholes
10	7/5/2020 16:30:30	Hilton Circle	33	39	21	36.20%	Stoniness
11	6/17/2020 16:48:55	Marine Drive	13	19	20	34.50%	Erosion
12	6/17/2020 16:50:18	South Road	2	12	20	34.50%	Erosion
13	6/18/2020 14:31:20	Valerie Road	3	9	20	34.50%	Loose Material, Stoniness, Erosion
14	6/20/2020 13:47:34	Flat Road	1	10	20	34.50%	Corrugation, Stoniness, Potholes
15	6/23/2020 16:29:26	Stream Road	24	26	20	34.50%	Loose Material, Erosion
16	7/3/2020 16:38:19	Carla Road	29	35	20	34.50%	Stoniness
17	7/3/2020 17:38:41	Boundary Road	19	27	20	34.50%	Stoniness, Potholes
18	7/5/2020 15:44:56	Freda Street	1	9	20	34.50%	Potholes
19	6/20/2020 13:49:47	Surf Road	2	6	19	32.80%	Corrugation, Potholes
20	6/22/2020 15:01:13	High Level Road	10	33	19	32.80%	
21	6/23/2020 16:31:40	Stream Road	20	22	19	32.80%	Erosion
22	6/17/2020 16:54:59	Gull Street	11	23	18	31.00%	
23	6/18/2020 15:10:45	Ted Road	3	4	18	31.00%	Corrugation, Loose Material, Stoniness, Erosion
24	7/3/2020 16:43:32	Caesar Road	89	101	18	31.00%	Potholes
25	7/3/2020 16:48:28	Edward Road	39	54	17	29.30%	Potholes
26	7/3/2020 16:53:06	Caspar Road	6	47	17	29.30%	Potholes
27	6/18/2020 14:35:05	Penguin Road	1	8	16	27.60%	Erosion
28	6/17/2020 16:53:38	Albatross Road	14	24	15	25.90%	
29	6/17/2020 16:56:11	Gull Street	1	11	15	25.90%	Potholes
30	6/18/2020 14:41:31	Promontory Road	1	7	15	25.90%	

TABLE 3: Streets requiring ROUTINE MAINTENANCE  
(in order of priority based ONLY on Condition Index: 30 from 45 records)

## PRINGLE BAY GRAVEL STREET CONDITION SURVEY RESULTS

### STREETS IDENTIFIED FOR DUST POLLUTION CONTROL

Priority	Street Name	From Street number:	To Street Number:	Length (m)
1	Crescent Road	10	16	182
2	Boundary Road	37	58	140
3	False Bay Road	2	19	356
4	Beach Road	1	16	277
5	Anne Road	31	67	580

TABLE 4: Streets identified for DUST POLLUTION CONTROL  
(in order of priority based ONLY on Condition Index: 5 from 5 records)

Over and above the results shown above, it is evident that stormwater drainage (or rather the lack thereof), is the single most important cause for the deterioration of the streets, especially when one considers the state of the streets at various intersections and junctions.

It is also evident that where channels are actually provided along the roads to accommodate longitudinal runoff, these channels tend to favour runoff from the adjacent plots and not so much the run-off from the streets. The main reason for this seems to be the piling of the excavated material on the road edge side resulting in the street being formed as a channel. In most cases, if attention is given to the grading of the streets to shape the surface to feed into the road side channel and rather place the excess material on the plot side of the channel, a much better transverse drainage regime will be achieved.

**Based on the above mentioned conclusions, it is recommended to:**

- A. Include the above-mentioned priorities in the Overstrand Municipality's Pringle Bay Gravel Street Pavement Management Plan if it exist, otherwise to engage in an initiative to compile such a plan.
- B. Allocate existing approved finance to focus on the priority street sections listed in Tables 2 and 3. We suggest to focus effort and resources as follows:
  - i. Of the remaining budget for the current financial year, approximately 300m of streets can be rehabilitated. Referring to Table 1, we suggest to proceed with Midway Street and Hilda Circle totalling approximately 322m. Alternatively, Midway Street and Zandra Road should be rehabilitated totalling 265m.
  - ii. Of the remaining budget for the current financial year, approximately 4,000m of roads can be addressed for Corrective Maintenance. Table 2 contains the priority list for Corrective Maintenance totalling approximately 4,174m of gravel streets.
- C. Include streets listed in Table 1 (if not already budgeted for) in the following adjusted budget cycle.
- D. Include in the 2021/2022 budget the estimated maintenance cost of the remaining streets including those that could follow in the updated quarterly Gravel Street Condition Survey Report.

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## **ANNEXURE A**

Refer to separate document titled:

“PRINGLE BAY GRAVEL STREET CONDITION SURVEY: A PRACTICAL MANUAL”



## ANNEXURE B: (FIELD DATA SURVEY FORM)

PRINGLE BAY GRAVEL STREET CONDITION SURVEY										
EVALUATOR					DATE	dd:	mm:	yy:		
STREET NAME					SECTION					
GENERAL PERFORMANCE	1	2	3	4	5	MOISTURE CONTENT	Wet		Dry	
GRAVEL QUANTITY	Plenty	1	Sufficient	2	Isolated Exposure	3	Extensive Exposure	4	None	5
ROAD PROFILE/SHAPE	Very Good (4%)	1	Good (2%)	2	Flat	3	Uneven	4	Very Uneven	5
DRAINAGE FROM THE ROAD	Well Above Ground	1	Slightly Above	2	Level with Ground	3	Slightly Below	4	Canal	5
DRAINAGE ALONG THE ROAD	Well defined shaped canal	1	Natural canal	2	Visible signs of Erosion	3	Severe Erosion on side of road	4	Dangerous Erosion / Donga on side of road	5
RIDING QUALITY / SAFETY	Very Good (35-40km/h)	1	Good (30-35km/h)	2	Average (25-30km/h)	3	Poor (20-25km/h)	4	Very Poor (<20km/h)	5
INFLUENCING FACTORS	Corrugation	Loose Material		Stoniness		Potholes		Ruts	Erosion	
ISOLATED PROBLEMS	Potholes	Corrugation		Transverse Erosion	Longitudinal Erosion		Rough patches	Slipperiness		
DUST	Acceptable		Unacceptable							
TRAFFICABILITY	Acceptable		Unacceptable							
<b>COMMENTS</b>										

# ANNEXURE C

## ELECTRONIC INPUT FORM



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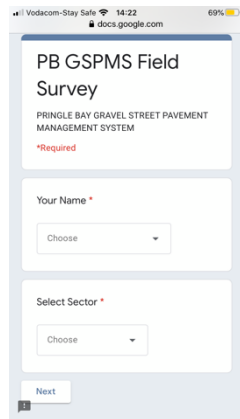
**PB GSPMS Field Survey**

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**PB GSPMS Field Survey**

PRINGLE BAY GRAVEL STREET PAVEMENT MANAGEMENT SYSTEM

\*Required

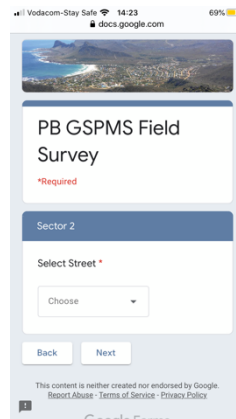
Your Name \*

Choose

Select Sector \*

Choose

Next



Vodacom-Stay Safe 14:23 69%

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**PB GSPMS Field Survey**

\*Required

Sector 2

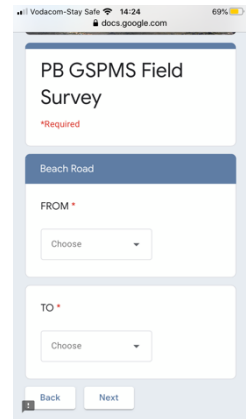
Select Street \*

Choose

Back Next

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**PB GSPMS Field Survey**

\*Required

Beach Road

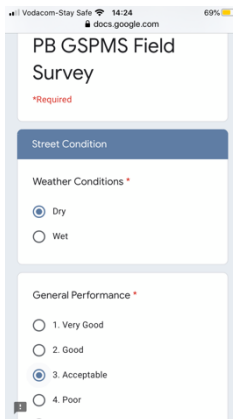
FROM \*

Choose

TO \*

Choose

Back Next



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**PB GSPMS Field Survey**

\*Required

Street Condition

Weather Conditions \*

Dry

Wet

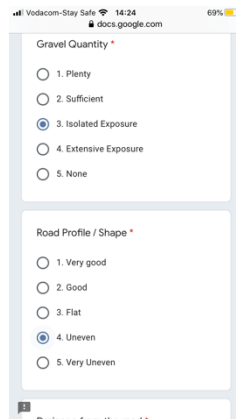
General Performance \*

1. Very Good

2. Good

3. Acceptable

4. Poor



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Gravel Quantity \*

1. Plenty

2. Sufficient

3. Isolated Exposure

4. Extensive Exposure

5. None

Road Profile / Shape \*

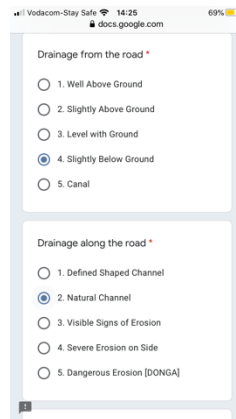
1. Very good

2. Good

3. Flat

4. Uneven

5. Very Uneven



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Drainage from the road \*

1. Well Above Ground

2. Slightly Above Ground

3. Level with Ground

4. Slightly Below Ground

5. Canal

Drainage along the road \*

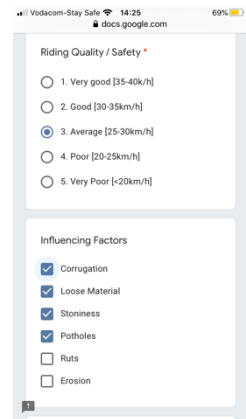
1. Defined Shaped Channel

2. Natural Channel

3. Visible Signs of Erosion

4. Severe Erosion on Side

5. Dangerous Erosion [DONGA]



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Riding Quality / Safety \*

1. Very good [35-40km/h]

2. Good [30-35km/h]

3. Average [25-30km/h]

4. Poor [20-25km/h]

5. Very Poor [15-20km/h]

Influencing Factors

Corrugation

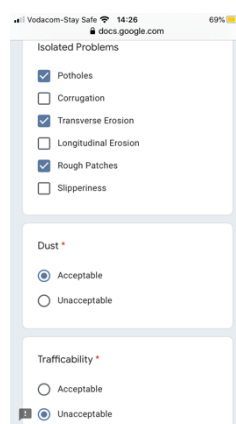
Loose Material

Stoniness

Potholes

Ruts

Erosion



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Isolated Problems

Potholes

Corrugation

Transverse Erosion

Longitudinal Erosion

Rough Patches

Slipperiness

Dust \*

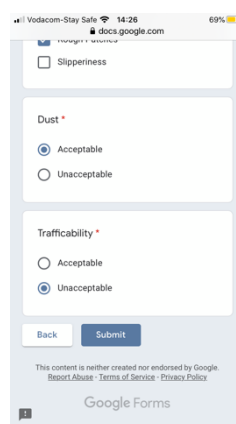
Acceptable

Unacceptable

Trafficability \*

Acceptable

Unacceptable



Vodacom-Stay Safe 14:26 69%

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Slipperiness

Dust \*

Acceptable

Unacceptable

Trafficability \*

Acceptable

Unacceptable

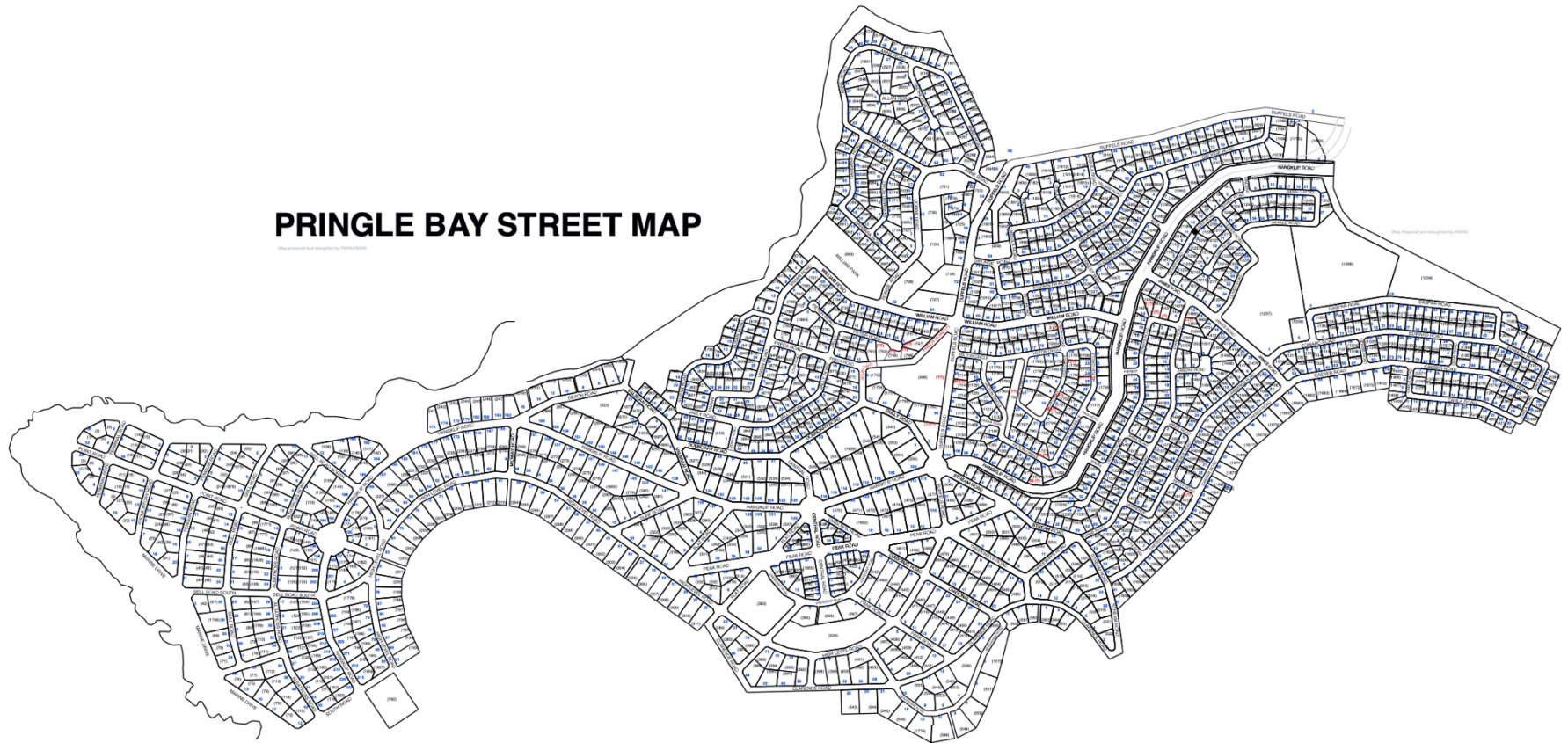
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## ANNEXURE D

### PRINGLE BAY STREET MAP



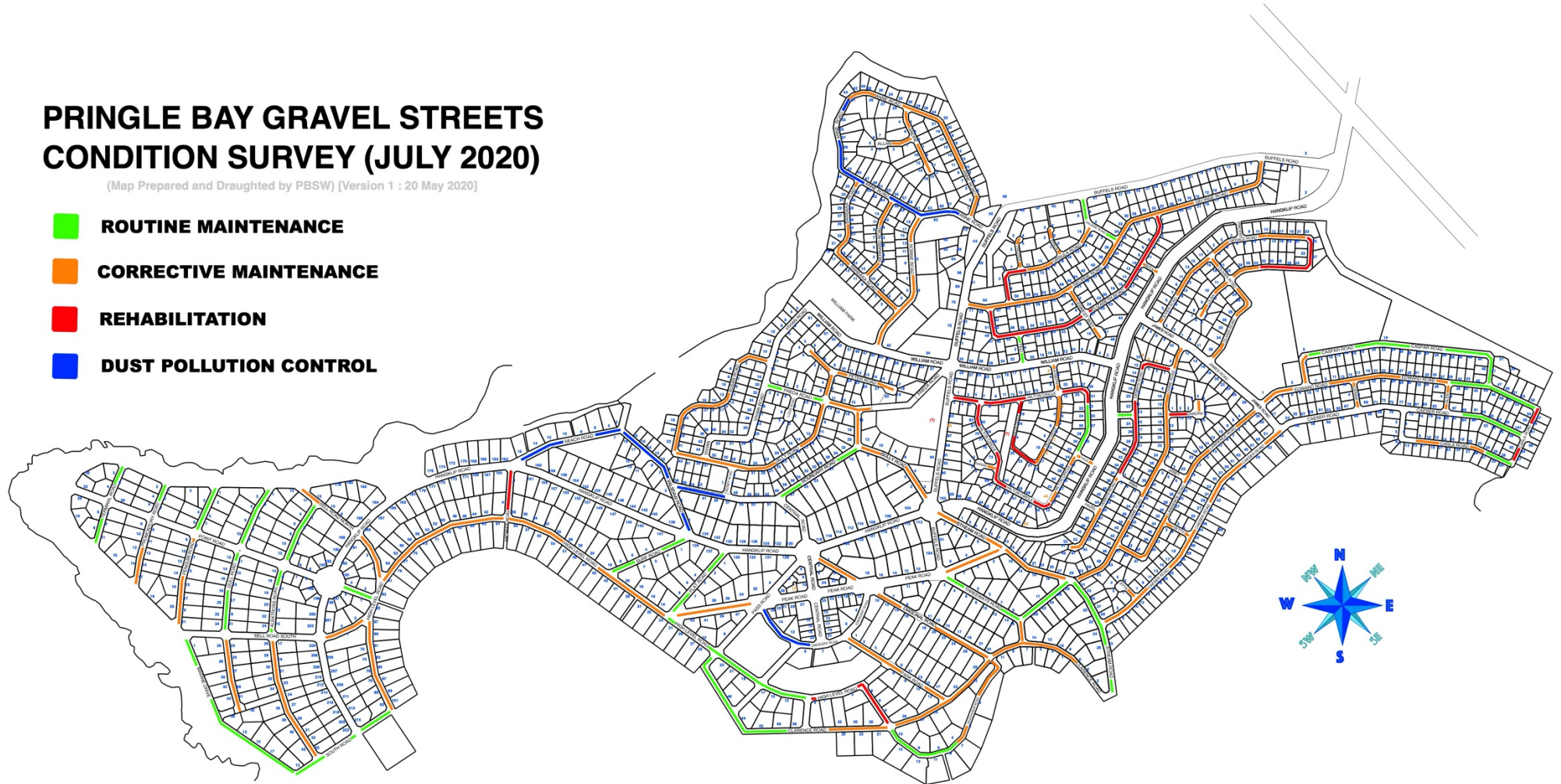
## ANNEXURE E

MAP SHOWING MAINTENANCE REQUIREMENTS TOGETHER WITH UNFILTERED PROCESSED DATA

### PRINGLE BAY GRAVEL STREETS CONDITION SURVEY (JULY 2020)

(Map Prepared and Draughted by PBSW) [Version 1 : 20 May 2020]

- **ROUTINE MAINTENANCE**
- **CORRECTIVE MAINTENANCE**
- **REHABILITATION**
- **DUST POLLUTION CONTROL**



## PRINGE BAY GRAVEL STREET CONDITION SURVEY RESULTS

### ABBREVIATED SUMMARY OF RECORDED DATA

Timestamp	Street Name	From #	To #	INDEX	SCORE	MAINTENANCE	Influencing Factors
6/17/2020 15:06:37	Gull Street	23	31	26	44.80%	Corrective	Potholes, Erosion
6/17/2020 16:47:06	Marine Drive	1	13	22	37.90%	Routine	Potholes
6/17/2020 16:48:55	Marine Drive	13	19	20	34.50%	Routine	Erosion
6/17/2020 16:50:18	South Road	2	12	20	34.50%	Routine	Erosion
6/17/2020 16:52:09	Albatross Road	26	42	33	56.90%	Corrective	Potholes
6/17/2020 16:53:38	Albatross Road	14	24	15	25.90%	Routine	
6/17/2020 16:54:59	Gull Street	11	23	18	31.00%	Routine	
6/17/2020 16:56:11	Gull Street	1	11	15	25.90%	Routine	Potholes
6/17/2020 22:42:42	Beach Road	1	1	29	50.00%	Corrective	Stoniness
6/18/2020 14:28:45	George Road	69	1	36	62.10%	Corrective	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion
6/18/2020 14:31:20	Valerie Road	3	9	20	34.50%	Routine	Loose Material, Stoniness, Erosion
6/18/2020 14:32:53	Penguin Road	21	9	28	48.30%	Corrective	Corrugation, Potholes
6/18/2020 14:35:05	Penguin Road	1	8	16	27.60%	Routine	Erosion
6/18/2020 14:38:52	Promontory Road	17	8	26	44.80%	Corrective	Corrugation, Potholes
6/18/2020 14:41:31	Promontory Road	1	7	15	25.90%	Routine	
6/18/2020 14:45:49	Ursula Road	3	26	29	50.00%	Corrective	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion
6/18/2020 14:46:06	Terminal Road	1	11	15	25.90%	Routine	
6/18/2020 14:47:58	Erica Road	1	3	31	53.40%	Corrective	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion



6/18/2020 14:56:05	Ernest Way	3	11	26	44.80%	Corrective	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion
6/18/2020 14:58:38	Midway Street	1	3	33	56.90%	Corrective	Potholes, Ruts, Erosion
6/18/2020 15:00:01	Bell Road North	1	14	24	41.40%	Corrective	Potholes, Erosion
6/18/2020 15:08:38	High Level Road	61	83	24	41.40%	Corrective	Potholes
6/18/2020 15:09:08	Elizabeth Road	3	51	39	67.20%	Rehab	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion
6/18/2020 15:09:47	High Level Road	84	101	25	43.10%	Corrective	Potholes, Erosion
6/18/2020 15:10:45	Ted Road	3	4	18	31.00%	Routine	Corrugation, Loose Material, Stoniness, Erosion
6/18/2020 15:11:10	Point Road	1	32	15	25.90%	Routine	Potholes
6/18/2020 15:12:05	Albatross Road	1	12	21	36.20%	Routine	Potholes
6/18/2020 15:13:28	South Road	2	6	26	44.80%	Corrective	Loose Material, Erosion
6/18/2020 15:40:37	Rita Road	1	2	35	60.30%	Corrective	Loose Material, Stoniness, Potholes, Erosion
6/18/2020 17:05:20	Anne Road	41	61	30	51.70%	Corrective	Stoniness
6/18/2020 17:08:17	Andre Road	1	16	24	41.40%	Corrective	Stoniness
6/18/2020 17:13:08	Barbara Road	1	19	29	50.00%	Corrective	Loose Material
6/18/2020 17:14:52	Barbara Road	21	35	31	53.40%	Corrective	Loose Material
6/18/2020 17:16:53	Bernard Road	1	18	25	43.10%	Corrective	Loose Material
6/18/2020 17:20:55	Bobbie Road	1	19	24	41.40%	Corrective	Loose Material
6/18/2020 17:23:02	Allan Road	1	5	31	53.40%	Corrective	Loose Material, Stoniness
6/18/2020 17:26:54	Anne Road	1	39	27	46.60%	Corrective	Loose Material, Stoniness
6/19/2020 10:58:10	George Road	64	71	36	62.10%	Corrective	Potholes, Ruts, Erosion
6/19/2020 10:59:59	Ursula Road	3	8	40	69.00%	Rehab	Potholes, Ruts, Erosion
6/19/2020 11:02:10	Elizabeth Road	6	14	44	75.90%	Rehab	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion



6/19/2020 11:06:11	Elizabeth Road	5	11	35	60.30%	Corrective	Loose Material, Stoniness, Potholes, Erosion
6/20/2020 13:44:49	Peak Road	32	43	29	50.00%	Corrective	Stoniness, Potholes, Erosion
6/20/2020 13:47:34	Flat Road	1	10	20	34.50%	Routine	Corrugation, Stoniness, Potholes
6/20/2020 13:49:47	Surf Road	2	6	19	32.80%	Routine	Corrugation, Potholes
6/20/2020 13:51:03	Surf Road	6	10	8	13.80%	Routine	
6/20/2020 13:54:52	Midway Street	1	4	42	72.40%	Rehab	Loose Material, Stoniness, Potholes, Erosion
6/20/2020 13:58:28	Beach Road	1	16	24	41.40%	Corrective	Corrugation, Potholes, Erosion
6/20/2020 14:01:31	False Bay Road	1	19	43	74.10%	Rehab	Corrugation, Stoniness, Potholes, Erosion
6/20/2020 14:09:16	High Level Road	22	38	36	62.10%	Corrective	Corrugation, Stoniness, Potholes
6/22/2020 13:57:45	Diagonal Road	10	18	23	39.70%	Corrective	Potholes, Ruts
6/22/2020 13:59:53	Diagonal Road	18	28	26	44.80%	Corrective	Stoniness, Ruts, Erosion
6/22/2020 14:04:19	Beach View Road	2	7	37	63.80%	Corrective	Stoniness, Potholes, Erosion
6/22/2020 14:07:01	Beach View Road	7	13	22	37.90%	Routine	Stoniness
6/22/2020 14:08:09	Beach View Road	13	17	8	13.80%	Routine	
6/22/2020 14:29:12	High Level Road	23	9	25	43.10%	Corrective	Corrugation, Potholes
6/22/2020 14:31:15	High Level Road	9	1	42	72.40%	Rehab	Stoniness, Ruts, Erosion
6/22/2020 14:39:31	Clarence Road	20	22	33	56.90%	Corrective	Corrugation, Stoniness, Potholes
6/22/2020 14:43:10	Clarence Road	15	26	25	43.10%	Corrective	Corrugation, Potholes
6/22/2020 14:47:46	Clarence Road	26	38	38	65.50%	Corrective	Corrugation, Potholes, Erosion
6/22/2020 14:49:55	Clarence Road	38	46	21	36.20%	Routine	Stoniness
6/22/2020 14:50:57	Clarence Road	46	50	8	13.80%	Routine	
6/22/2020 14:55:45	Park Road	19	7	32	55.20%	Corrective	Loose Material, Stoniness, Ruts, Erosion
6/22/2020 14:57:18	Park Road	7	1	23	39.70%	Corrective	Stoniness, Potholes
6/22/2020 15:01:13	High Level Road	10	33	19	32.80%	Routine	
6/22/2020 15:03:47	High Level Road	33	20	25	43.10%	Corrective	Stoniness, Potholes



6/23/2020 10:17:16	Peak Road	3	7	33	56.90%	Corrective	Potholes
6/23/2020 16:17:11	Threeways Road	2	28	22	37.90%	Routine	Stoniness, Potholes, Erosion
6/23/2020 16:20:57	Threeways Road	16	16	22	37.90%	Routine	Stoniness, Erosion
6/23/2020 16:29:26	Stream Road	24	26	20	34.50%	Routine	Loose Material, Erosion
6/23/2020 16:31:40	Stream Road	20	22	19	32.80%	Routine	Erosion
6/23/2020 16:34:24	Stream Road	16	18	21	36.20%	Routine	Erosion
6/23/2020 16:37:34	Stream Road	10	16	25	43.10%	Corrective	Potholes, Erosion
6/23/2020 16:40:01	Stream Road	2	8	28	48.30%	Corrective	Potholes, Erosion
6/24/2020 11:58:13	Stream Road	1	43	32	55.20%	Corrective	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion
6/24/2020 11:59:55	Zyta Road	1	6	28	48.30%	Corrective	Corrugation, Loose Material, Stoniness
6/24/2020 12:02:18	Zandra Road	1	3	41	70.70%	Rehab	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion
6/24/2020 12:04:09	Zandra Road	4	12	32	55.20%	Corrective	Corrugation, Loose Material, Stoniness, Potholes, Ruts, Erosion
6/24/2020 12:06:03	Caeser Road	1	54	27	46.60%	Corrective	Corrugation, Loose Material, Potholes, Ruts, Erosion
6/27/2020 11:59:13	Bobbie Road	2	4	36	62.10%	Corrective	Potholes
6/30/2020 17:47:01	Betty Road	1	6	23	39.70%	Corrective	Loose Material, Erosion
6/30/2020 17:50:22	Lawrence Road	1	44	27	46.60%	Corrective	Potholes, Erosion
7/2/2020 13:20:20	Dennys Road	1	34	40	69.00%	Rehab	Loose Material, Stoniness, Potholes, Ruts, Erosion
7/2/2020 13:22:37	Dennys Road	39	51	35	60.30%	Corrective	Potholes, Erosion
7/2/2020 13:24:26	Diane Road	1	12	37	63.80%	Corrective	Potholes, Ruts, Erosion
7/2/2020 13:26:19	Diane Road	13	52	26	44.80%	Corrective	Potholes, Ruts, Erosion
7/2/2020 13:27:44	Henry Street	1	2	22	37.90%	Routine	Potholes
7/3/2020 16:36:18	Carla Road	15	29	33	56.90%	Corrective	Stoniness, Potholes, Erosion



7/3/2020 16:38:19	Carla Road	29	35	20	34.50%	Routine	Stoniness
7/3/2020 16:40:55	Carla Road	35	57	39	67.20%	Rehab	Potholes, Ruts, Erosion
7/3/2020 16:43:32	Caeser Road	89	101	18	31.00%	Routine	Potholes
7/3/2020 16:45:54	Glen Road	1	6	36	62.10%	Corrective	Ruts, Erosion
7/3/2020 16:48:28	Edward Road	39	54	17	29.30%	Routine	Potholes
7/3/2020 16:53:06	Caspar Road	6	47	17	29.30%	Routine	Potholes
7/3/2020 16:54:51	Caspar Road	1	6	32	55.20%	Corrective	Potholes, Erosion
7/3/2020 16:57:01	Denise Road	1	6	36	62.10%	Corrective	Stoniness, Erosion
7/3/2020 17:01:05	Edward Road	1	37	23	39.70%	Corrective	Corrugation, Stoniness, Potholes
7/3/2020 17:04:17	Oliver Road	26	36	23	39.70%	Corrective	Stoniness, Potholes
7/3/2020 17:06:47	Oliver Road	16	26	35	60.30%	Corrective	Ruts, Erosion
7/3/2020 17:09:47	Gerald Road	1	23	25	43.10%	Corrective	Stoniness, Potholes
7/3/2020 17:12:35	Gerald Road	23	34	39	67.20%	Rehab	Ruts, Erosion
7/3/2020 17:14:15	Gerald Road	34	40	33	56.90%	Corrective	Stoniness, Ruts, Erosion
7/3/2020 17:16:35	Olga Road	1	6	28	48.30%	Corrective	Stoniness, Ruts, Erosion
7/3/2020 17:20:00	Oliver Road	1	17	38	65.50%	Corrective	Potholes, Erosion
7/3/2020 17:31:08	Clarence Road	2	18	25	43.10%	Corrective	Potholes, Erosion
7/3/2020 17:36:33	Gully Road	1	9	38	65.50%	Corrective	Stoniness, Potholes, Erosion
7/3/2020 17:38:41	Boundary Road	19	27	20	34.50%	Routine	Stoniness, Potholes
7/5/2020 14:22:00	Boundary Road	50	58	31	53.40%	Corrective	Potholes, Erosion
7/5/2020 15:33:50	Jally Road	39	43	38	65.50%	Corrective	Stoniness, Potholes, Erosion
7/5/2020 15:36:18	Susan Road	31	23	36	62.10%	Corrective	Stoniness, Potholes, Ruts, Erosion
7/5/2020 15:38:43	Susan Road	23	3	25	43.10%	Corrective	Stoniness, Erosion
7/5/2020 15:39:56	Susan Road	3	1	23	39.70%	Corrective	Stoniness, Erosion
7/5/2020 15:44:56	Freda Street	1	9	20	34.50%	Routine	Potholes
7/5/2020 15:47:08	Freda Street	9	17	31	53.40%	Corrective	Stoniness, Potholes, Erosion

7/5/2020 15:50:16	Boundary Road	16	20	31	53.40%	Corrective	Loose Material, Stoniness, Erosion
7/5/2020 15:53:58	Jally Road	2	6	36	62.10%	Corrective	Stoniness, Potholes, Erosion
7/5/2020 15:56:40	Peter Road	5	9	25	43.10%	Corrective	Potholes, Erosion
7/5/2020 15:59:40	Peter Road	9	17	26	44.80%	Corrective	Potholes, Erosion
7/5/2020 16:03:03	Jally Road	8	18	24	41.40%	Corrective	Erosion
7/5/2020 16:05:27	Jally Road	18	26	26	44.80%	Corrective	Potholes, Erosion
7/5/2020 16:08:56	Boundary Road	20	40	21	36.20%	Routine	Potholes
7/5/2020 16:11:40	Gully Road	2	12	36	62.10%	Corrective	Corrugation, Potholes, Erosion
7/5/2020 16:27:26	Hilton Circle	1	33	39	67.20%	Rehab	Stoniness, Potholes, Erosion
7/5/2020 16:30:30	Hilton Circle	33	39	21	36.20%	Routine	Stoniness
7/5/2020 16:32:00	Paul Road	1	2	28	48.30%	Corrective	Stoniness, Ruts
7/5/2020 16:34:16	Hilton Circle	41	53	34	58.60%	Corrective	Potholes, Erosion
7/5/2020 16:37:36	Hilton Circle	53	83	39	67.20%	Rehab	Stoniness, Potholes, Erosion
7/5/2020 16:38:35	Bassia Street	1	4	24	41.40%	Corrective	Stoniness, Potholes
7/5/2020 16:42:13	Hilda Circle	1	17	27	46.60%	Corrective	Potholes, Erosion
7/5/2020 16:45:13	Hilda Circle	17	20	39	67.20%	Rehab	Potholes, Ruts, Erosion
7/5/2020 16:47:20	Joseph Road	1	5	24	41.40%	Corrective	Stoniness, Ruts, Erosion
7/6/2020 16:57:08	Protea Road	2	3	24	41.40%	Corrective	Loose Material, Potholes, Erosion