



## REQUEST FOR SURVEY WORK

*Please do not remove the grey highlighted text from the request form*

Date Requested: \_\_\_\_\_

Survey requested by (Company): \_\_\_\_\_

Contact person Name: \_\_\_\_\_

Phone number: \_\_\_\_\_

E-mail address: \_\_\_\_\_

Name of the SANRAL Project  
Manager: \_\_\_\_\_

SANRAL Project Number : \_\_\_\_\_

### Note:

*The survey shall be undertaken in terms of the TMH11 version 3.0 dated April 2017.*

*Chapters 1, 2, 3 and 12 are relevant to all surveys and must be read with the other chapters and sections referred to in this survey request.*

## SURVEY REQUEST

Please mark all the relevant boxes with a tick



### 1. GENERAL

1.1. Route/Section: \_\_\_\_\_ SANRAL Region: \_\_\_\_\_

1.2. Title of the project

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1.3. Is the extent of the survey indicated on a Photo/Google/Bing image?

Yes	No
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**IF NOT:**

1.4. Is the extent of the survey specified and attached to this request as Annexure A?

Yes	N/A
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**Note:**

- It is important that the start and end points of an existing road strip survey be shown on a photo/Google/Bing image;
- It is also important to show the extent of all other areas to be surveyed such as, borrow pits and larger surveys areas on a photo or Google/Bing image

## 2. PURPOSE OF THE SURVEY

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## PART A

## 3. SURVEY REQUIREMENTS

**Note:**

If Part A does not make provision for the survey work required, then Part B (Paragraph 4) must be completed

### 3.1 TOPOGRAPHICAL SURVEYS

*(TMH11 Section 6.1 and 6.2 and in addition to that for wider areas section 6.6 and/or 6.7 or 6.9 and 6.8 for splicing of the ground survey into the aerial/lidar survey where aerial/lidar surveys were requested*

3.1.1 Existing road survey required?

Yes	No
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Brief description of the requirements:

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3.1.2 Greenfield alignment survey required?

Yes	N/A
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Description of the extent:

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Is the survey limited to the existing declared road reserve or a wider strip?

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If wider, one side or both sides?

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By how many meters?

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3.1.3 Borrow pit survey required? (TMH11 Section 6.5.1 and 6.5.2) ☐

3.1.3.1 Survey access road to borrow pit? 

Yes	No
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3.1.4 Quarry survey required? (TMH11 Sections 6.5.1 and 6.5.3) ☐

3.1.4.1 Will blasting take place (TMH11 Section 6.5.3(a)) 

Yes	No
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3.1.4.2 Survey access road to quarry? 

Yes	No
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3.1.5 Is a survey required for route optimization?  
(TMH11 Sections 6.6 and/or 6.7 or 6.9) ☐

3.1.6 Is a survey required for basic planning?  
(TMH11 Sections 6.6 and/or 6.7 or 6.9) ☐

3.1.7 Is a survey required for drainage calculations of a catchment area? ☐  
 (TMH11 Sections 6.6 and/or 6.7 or 6.9 and possibly 6.8 when  
 Combined with detail design)

## 3.2 MONITORING SURVEYS (TMH11 CHAPTER 9) | | | |-----|-----| | Yes | N/A | |-----|-----|

3.2.1 Of structures ☐  
 Structure description: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3.2.2 Of slopes ☐  
 Slope description: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3.2.3 Of surfaces

☐

Surface description: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3.2.4 For other purposes, to be specified

☐

\_\_\_\_\_  
\_\_\_\_\_

3.3 BRIDGE SITE SURVEYS

☐

3.3.1 For the design of new/existing structures (Bridges/Major culverts)

3.3.1.1 Will site surveys be required?

Yes	No
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If yes:

- Road over road (TMH11 Sections 6.4.1 and 6.4.2) ☐
- Road over rail (TMH11 Sections 6.4.1 and 6.4.4) ☐
- Road over river (TMH11 Sections 6.4.1 and 6.4.3) ☐
- Road over streams (culverts) (TMH11 Sections 6.4.1 and 6.4.5) ☐
- Any other type of site survey required? (To be described below) ☐

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**3.3.1.2 Sites to be surveyed must be listed as follows:**

Site Description	Km reference according to the marker boards or site center point co-ordinates	Comments

**3.3.1.3 Were the survey areas, if not the normal radiuses as specified in TMH11, shown on a photo/Google maps/ Bing maps (Standard radius to be included) ☐**

**Note:**

- a) *TMH11 specifies the extent for different types of site surveys by means of a radius.  
It is important for the design engineer to specify the exact extent required.  
This can avoid a lot of unnecessary survey work especially in difficult areas.  
If the extent is not specified as shown on the photo, the survey area will then be as specified in TMH11.*
- b) *Photogrammetric/lidar survey is normally wide enough to cover the extent of the site survey.  
Consideration must be given whether additional site surveys in terms of TMH11 are required.  
The photogrammetric/lidar survey can be complimented by additional ground survey observation, underwater cross-sections at rivers and rail heights at railway crossings etc.*

### 3.4 STRUCTURAL SURVEYS

#### 3.4.1 Existing structures (TMH11 Section 8.7 and Chapter 14)

3.4.1.1 Will as-built survey information of existing structures be required?

Yes	No
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If yes:

- Bridges (TMH11 Sections 8.7.1, 8.7.2, 8.7.3 and 8.7.4) ☐
- Major culverts-cross sectional opening  $>5\text{m}^2$  but less than  $36\text{ m}^2$  (TMH11 Sections 8.7.1, 8.7.2, 8.7.3 and 8.7.5) ☐
- Lesser culverts (smaller as defined for major culverts) ☐  
This normally forms part of the detail contour survey and structural surveys are seldom undertaken
- Gantries (TMH11 Sections 8.7.1, 8.7.2, 8.7.3 and 8.7.6) ☐
- Any other type of structural survey required including upstream structures, to be described below

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3.4.1.2 Structures to be surveyed must be listed as follows and the positions be shown on a photo or Google image:

Structure Number	Structure Description	Km reference according to the marker boards or site center point co-ordinates	Comments



#### 3.4.1.3 Were the structure positions shown on photos/Google/Bing image.

Yes	No
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**Note:**

**It is compulsory to show the structure positions on Google/Bing image. Culvert sizes and openings are shown on the topographical survey plans. Refer to section 6.1.4(e) in TMH11 for information that will be supplied before an instruction for a structural survey is issued.**

## PART B

#### 4. SURVEY REQUIREMENTS

*Only to be completed if Part A (Paragraph 3) does not make provision for the survey work that is required.*

#### 4.1. Survey requirements

**Note:**

*(Descriptions of exactly what needs to be surveyed.*

*Reference must be made, where applicable, to specific chapters and clauses in TMH11)*

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.



**Note:**

*This can be attached as Annexure B if not enough space is provided for on this form.*

Survey requirements attached as Annexure B?

Yes

No, See Above

**4.2. Final deliverables**

Please provide an exact description of what final data must be submitted

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**Note:**

*This can form part of Annexure B if not enough space is provided on this form*

4.2.1. Final deliverable requirements form part of Annexure B?

Yes

No, See Above

**4.3. Format in which the data must be submitted**

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**(To be completed for Part A and Part B)**

**5. PERMANENT SURVEY CONTROL AND SURVEY DATUM**

5.1. Are you aware of any existing control?

Yes	No
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5.2. Is the **existing** control information required?

Yes	No
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5.3. Permanent survey control to be established (TMH11 Chapter 5)

Yes	No
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5.4. If yes, supply information on the survey system and datum on which the new control must be based

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**Note:**

*It is important that permanent control must be established for all surveys for future reference.*

5.5. If no permanent survey control is to be established, instructions must be issued regarding existing control/survey system that must be used for this survey.

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5.6. Have the co-ordinates of the existing control been supplied in ASCII/Excel format and is a printout also attached as Annexure C to this request?

Yes	No	N/A
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5.7. Is a verification survey required to confirm the quality of the existing control?

(TMH11 section 5.6)

Yes	No
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**(To be completed for Part A and Part B)**

## 6. OTHER RELEVANT INFORMATION

*(Only to be completed when detail contour surveys (Topographical surveys) are required in terms of TMH11 Chapter 6)*

6.1. Scale of the survey

1 :	N/A
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6.2. Contour interval

	N/A
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6.3. Expected vertical accuracy of the DTM (not observation accuracy)  
Refer to Section 3.2 in TMH11

	N/A
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6.4. Formats for digital CAD drawings

- Microstation
- Auto CAD
- Other (Specify)

Yes	No
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Yes	No
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6.5. Formats for DTMs

- Microstation TIN
- Auto Cad TIN
- Model Maker
- Civil Designer
- Other (Specify)

Yes	No
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Yes	No
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Yes	No
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Yes	No
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#### 6.6. Drawings

- Hard copy drawing in A0 size required 

Yes	No
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- Only continuous digital drawing required 

Yes	No
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- Continuous and A0 size digital drawings required 

Yes	No
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- Other (Specify)

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- 6.7 Ground survey detail and DTM's to be spliced into the photogrammetric/lidar survey (TMH11 Section 6.8).

Yes	No	N/A
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**To be completed for Part A and Part B**

#### 7. SUPPLEMENTARY INFORMATION

- 7.1. Field check surveys to be undertaken and supplied to the client (TMH11 Chapter 13) 

Yes	No
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- 7.2. Office check list to be completed and supplied to the client (TMH11 Section 13.2 and Annexure 24) 

Yes	No
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- Note: Compliance certificate to be submitted on completion (TMH11 Section 1.13 and Annexure 23) 

Yes	No
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#### 8. COMPLETION INFORMATION

- 8.1. Projected Completion Date

**Note:**

*This survey can only be undertaken by a registered surveyor in terms of TMH11 Chapter 1.18.*

**9. FINAL DELIVERABLES**

Refer to TMH11 Chapter 12

**10. GENERAL INFORMATION FOR THE SURVEYOR'S ATTENTION:**

(To be completed for part A and part B)

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**Survey requested by:**

Name: \_\_\_\_\_ Signed: \_\_\_\_\_ Date: \_\_\_\_\_

**Survey request approved by SANRAL Project Manager:**

Name: \_\_\_\_\_ Signed: \_\_\_\_\_ Date: \_\_\_\_\_

## REQUEST FOR SURVEY - STAKING AND ISSUING OF BEACON CERTIFICATES

Date Requested: \_\_\_\_\_

Survey requested by (Company):

Contact person Name:

Phone number:

E-mail address:

Name of the SANRAL Project  
Manager:


### PART A: STAKING OF ROAD RESERVE (for other staking see Part B)

#### 1. Request

1.1. You are hereby requested to stake the road reserve position and to issue beacon certificate/ certificates for the section of road as indicated below. The latest declaration and acquisition information must be used to determine the road reserve position.

1.2. Further instruction if any:


#### 2. Route description:

2.1. Route and Section Number

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2.2. Start km distance according to the blue km markers

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 Km

2.3. End km distance according to the blue km markers

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 Km

2.4. Description of start and end points where no km marker is available:

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2.5. Stake road reserve on the left hand side only 

Yes	No
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OR

The right hand side only 

Yes	No
-----	----

OR

Both sides 

Yes	No
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 of the road

3. Completion date

The anticipated date by when the position of the road reserve will be required

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**PART B: REQUEST FOR OTHER STAKING AND ISSUING OF BEACON CERTIFICATES**

**1. Request**

1.1. You are hereby requested to stake the boundary positions and to issue beacon certificate/certificates for the staked positions as indicated below.

1.2. Further instruction if any:

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**2. Route description:**

2.1. Route and Section Number

**3. Staking acquisition boundaries**

3.1. Acquisition diagram number/s

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**OR**

**4. Other areas**

4.1. Description of the staking required

(Please attached photos, plans or diagrams showing the items to be staked)

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**5. Completion date**

The anticipated date by when the staking must be completed

**(To be completed for requests under PART A and PART B)**

**CONTACT INFORMATION**

**1. The contact person for pointing out the beacons and signing of the beacon certificate is:**

**Name:**

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**Cellphone number:**

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**E-mail address:**

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**2. The Contact person to whom a copy of the beacon certificate must be submitted is:**

**Name:**

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**Cellphone number:**

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**E-mail address:**

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**3. The contact details of the affected landowner (if more than one, stipulate in separate schedule):**

**Name:**

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**Cellphone number:**

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**E-mail address:**

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**4. For any enquiries please contact:**

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**Staking requested by:**

**Signed:** \_\_\_\_\_ **Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Staking approved by SANRAL Project Manager:**

**Signed:** \_\_\_\_\_ **Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

## SURVEY ACCURACIES

Note:

80% confident accuracy = 80% of all checked point must be within the stipulated accuracy.  
Refer to Chapter 3 of the TMH11 for more info on Survey Accuracies

		Surveyed spot Accuracy		80% confident accuracy	
Type	Comments and Applications	Position mm	Heights mm	Position mm	Height mm
<b>1. Topographical Surveys</b>					
<ul style="list-style-type: none"> <li>Conventional ground survey- Total Station</li> </ul>	<ul style="list-style-type: none"> <li>Road prism where more accurate heights are required</li> <li>Accurate detail survey where GPS reception is bad</li> <li>Other features where more accurate heights are required (E.g. building corners, floor levels, Overhangs, concrete surfaces)</li> <li>Invert levels for culverts and storm water networks</li> <li>Off the road prism</li> <li>Borrow pit and quarries</li> <li>Gravel roads</li> <li>Where less accurate heights are required as normally required on structures and paved road surfaces</li> <li>River cross sections</li> <li>Greenfield surveys</li> <li>Setting out points (positions only)</li> </ul>	50	10	75	30
<ul style="list-style-type: none"> <li>GPS survey</li> </ul>		50	50	75	90
<ul style="list-style-type: none"> <li>Mobile mapping ground survey</li> </ul>	<ul style="list-style-type: none"> <li>On the road surface up to the shoulder break point</li> <li>Can also be used on gravel roads</li> <li>Railway lines</li> <li>Same as for conventional topographical surveys</li> <li>If point clouds are required</li> <li>Can be used off the road surface in cuttings if the terrain is clear of vegetation (GPS accuracies will then apply)</li> <li>Structures as Bridges / culverts and storm water invert levels still to be surveyed by conventional survey methods</li> <li>Some detail may fall in Scanning "Shadow area" may need to have conventional infill surveys undertaken to include these items</li> </ul>	50	10	75	30
<ul style="list-style-type: none"> <li>Lidar survey</li> </ul>	<ul style="list-style-type: none"> <li>Production of orthophotos</li> <li>Recommended for vegetated areas where ground surveys will be difficult to undertake. Ground surveys still to be done on road surface/prism</li> <li>Large areas for basic planning</li> <li>Drainage calculations</li> <li>Not to be used for final design</li> <li>Large areas off the road prism and outside the road reserve</li> <li>Can be combined with conventional or mobile mapping on wider road strip surveys outside the road reserve</li> <li>Ground surveys inside the road reserve spliced into the lidar DTM</li> <li>Greenfield areas for provisional design and to determine areas that must be actually surveyed for detail design</li> </ul>	150	100	150	150

## SURVEY ACCURACIES

### Note:

80% confident accuracy = 80% of all checked point must be within the stipulated accuracy.  
Refer to Chapter 3 of the TWMH11 for more info on Survey Accuracies

Type	Comments and Applications	Surveyed spot Accuracy		80% confident accuracy	
		Position mm	Heights mm	Position mm	Height mm
<ul style="list-style-type: none"> <li>Terrestrial laser scanning for road and other surfaces</li> </ul>	<ul style="list-style-type: none"> <li>On the road surface up to the shoulder break point</li> <li>Can also be used on gravel roads</li> <li>Railway lines</li> <li>Same as for conventional topographical surveys</li> <li>Smaller areas where point clouds are required</li> <li>Can be used off the road surface in cuts and fills if the terrain is clear of vegetation (GPS accuracies will then apply)</li> <li>Not suitable for large areas</li> <li>Bridge openings</li> <li>Structural surveys</li> </ul>	50	10	75	30
<ul style="list-style-type: none"> <li>Terrestrial laser scanning for slopes</li> </ul>	<ul style="list-style-type: none"> <li>Model vertical/steep faces of slopes with point cloud</li> <li>Combine with conventional survey where the slopes are not steep and on the top of vertical the slopes</li> <li>3D modelling of slopes/faces and surroundings</li> </ul>	50	10	75	30
<ul style="list-style-type: none"> <li>Photogrammetric aerial survey / 1:4000 photograph</li> </ul>	<ul style="list-style-type: none"> <li>Larger areas off the road prism and outside the road reserve</li> <li>Ground survey to be spliced into photogrammetric survey</li> <li>Ideal for detail line mapping of high developed areas</li> <li>Less accurate than lidar survey</li> <li>Not very much in demand, clients rather use lidar surveys</li> <li>Volumetric calculation</li> <li>Used for route optimization</li> <li>Very popular for detail survey over and above what a lidar survey can supply</li> <li>Very dependent on vegetation for height accuracy. The more vegetation the lesser the accuracy</li> </ul>	150	100	225	200

## SURVEY ACCURACIES

**Note:**

80% confident accuracy = 80% of all checked point must be within the stipulated accuracy.  
Refer to Chapter 3 of the TWM11 for more info on Survey Accuracies

Type	Comments and Applications	Surveyed spot Accuracy		80% confident accuracy	
		Position mm	Heights mm	Position mm	Height mm
<ul style="list-style-type: none"> <li>Done survey</li> </ul>	<ul style="list-style-type: none"> <li>Orthophotos for smaller areas</li> <li>Not suitable for detail design</li> <li>Quick method to obtain reasonable height and positional information for optimization and analyses</li> <li>Ideal to determine and identify areas for accurate detail contour surveys</li> <li>Not suitable for large areas, maximum area approximately 200ha</li> <li>Suitable for the production of orthophotos for visual presentations</li> <li>Monitoring of construction activities and encroachments</li> <li>Volumetric calculations for mass earth works</li> <li>Cannot replace lidar surveys for larger areas</li> <li>Suitable for borrow pit and quarry surveys</li> <li>Visual rock anker inspection</li> <li>Visual bridge inspections</li> </ul>				
40m flying height 2.6cm GSD		100	60	150	120
120m flying height 5.2cm GSD		150	100	225	200
<b>2. Structures and as-built surveys</b>					
<ul style="list-style-type: none"> <li>Conventional ground survey (Using a Total station 3s accuracy or better)</li> </ul>	<ul style="list-style-type: none"> <li>Existing structures as bridges and major culverts</li> <li>Setting out of structures and foundations</li> <li>As-built information after construction</li> </ul>	3	3	5	5
<ul style="list-style-type: none"> <li>Terrestrial laser scanning</li> </ul>	<ul style="list-style-type: none"> <li>Existing structures as bridges and major culverts</li> <li>As-built information after construction</li> <li>Building - indoor modelling</li> <li>Building - facade modelling</li> <li>Slope stability surveys (vertical slopes) in combination with conventional ground surveys</li> </ul>	3	3	5	5
<b>3. Monitoring Surveys</b>					
<ul style="list-style-type: none"> <li>Terrestrial laser scanning</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring positions and height movement</li> <li>Used to determine movement of more than 5mm</li> <li>Not suitable for accurate monitoring where the expected movement is less than 5mm</li> <li>Ideal for monitoring of natural vertical slopes within rocky vertical surfaces</li> <li>Rock anker monitoring</li> </ul>	3	3	5	5

## SURVEY ACCURACIES

**Note:**

80% confident accuracy = 80% of all checked point must be within the stipulated accuracy.  
Refer to Chapter 3 of the TMH11 for more info on Survey Accuracies

Type	Comments and Applications	Surveyed spot Accuracy		80% confident accuracy	
		Position mm	Heights mm	Position mm	Height mm
<ul style="list-style-type: none"> <li>Precision conventional survey (Using a Total station 1/2s accuracy and or a precise level)</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring positions and height movement</li> <li>Monitoring movements of less than 5mm</li> <li>Movement on structures</li> <li>Movement on slopes provided that targets are placed on the monitoring surface and pillar beacons are constructed as monitoring control network</li> <li>Special survey equipment and survey equipment accessories is required (forced centering equipment / micrometers)</li> <li>Temperature affects readings and needs to be accounted for during measurement</li> </ul>	0,5	0,5	1	1
<b>4. Construction Survey Setting out</b>					
<ul style="list-style-type: none"> <li>Road reserve</li> </ul>	<ul style="list-style-type: none"> <li>Demarcation of jurisdictions</li> <li>For fencing or issuing of beacon certificates</li> </ul>			50	N/A
<ul style="list-style-type: none"> <li>Profiles</li> </ul>	<ul style="list-style-type: none"> <li>Road construction</li> </ul>	50	5	75	5
<ul style="list-style-type: none"> <li>Batter boards</li> </ul>	<ul style="list-style-type: none"> <li>Road construction</li> </ul>	50	10	75	5
<ul style="list-style-type: none"> <li>Structural foundations / General concrete features (E.g. Kerbs)</li> </ul>	<ul style="list-style-type: none"> <li>Road construction</li> </ul>	15	5	20	10
<ul style="list-style-type: none"> <li>General Structure setting out</li> </ul>	<ul style="list-style-type: none"> <li>Road construction (Culverts / Bridges)</li> </ul>	5	5	10	10
<ul style="list-style-type: none"> <li>Complex Structure setting out</li> </ul>	<ul style="list-style-type: none"> <li>Cable Stayed bridges / Suspension bridges / Incrementally launched bridges and Tunnels</li> <li>Specialized Survey Equipment Required and attachment accessories for prisms etc.</li> </ul>	1	1	3	3
<ul style="list-style-type: none"> <li>Volumetric measurement</li> </ul>	<ul style="list-style-type: none"> <li>Road construction, borrow pits and quarries</li> </ul>	50	20	75	90
<ul style="list-style-type: none"> <li>Layer works</li> </ul>	<ul style="list-style-type: none"> <li>Road construction</li> </ul>	50	5	75	20
<ul style="list-style-type: none"> <li>Final surface</li> </ul>	<ul style="list-style-type: none"> <li>Road construction</li> </ul>	50	5	75	20
<b>5. Establishment of Control</b>					
5a. Establishment of permanent control points for topographical surveys and construction setting out of roads and simple structures (includes the scale factor as per the South African projection and coordinate system and Sea level correction)	<ul style="list-style-type: none"> <li>Survey control for topo surveys</li> <li>Control for construction works of roads and simple Structures (Culverts and drainage networks, minor bridges)</li> <li>General permanent control for any other surveys but not for monitoring surveys or structures with higher construction tolerances</li> <li>Includes scale and sea level correction</li> </ul>	10*	3*	20*	5*
5b. Establishment of permanent control points for construction setting out of complex structures, bridges, tunnels and for Monitoring purposes. (Excludes the scale factor in the co-ordinate calculations and is calculated as a tight "localized" network - excludes Sea level correction)	<ul style="list-style-type: none"> <li>Should be constructed as pillar beacons</li> <li>Requires precise survey equipment for observations</li> <li>Requires technical calculations of Survey readings</li> <li>Must not include any scale factor and sea level correction.</li> </ul>	2*	1*	5*	3*
6. Existing Mowbray orthophotos and DTM	<ul style="list-style-type: none"> <li>Route optimization</li> <li>Not accurate enough for basic planning</li> <li>Lidar survey to be obtained when more accurate data is required</li> </ul>			5000	2000

\* Between successive points 300m apart

EDMS# 8747222

## SANRAL Survey Request Process Flow Diagram

