

RGS03366.1-AB

21 July 2023

Coast Building Company  
PO Box 24  
WINGHAM NSW 2429

Delivered via email to: [info@coastbuilding.com.au](mailto:info@coastbuilding.com.au)

**Attention:** Michael Kucinski

Dear Michael

**RE: 80 Seabreeze Parade, Green Point (Lot 40 DP31825)**  
**Geotechnical Site Classification for Proposed Residential Dwelling**

## 1 INTRODUCTION

Regional Geotechnical Solutions Pty Ltd (RGS) has undertaken a geotechnical site classification for a proposed dwelling to be located at 80 Seabreeze Parade, Green Point (Lot 40 DP31825). The purpose of the geotechnical assessment was to provide a site classification in accordance with AS2870-2011 *Residential Slabs and Footings*, to assist in the design of the footings for the proposed building.

No detailed site plan has been provided. In providing this report and site classification it has been assumed that the performance expectations of AS2870-2011 are acceptable for the proposed structure.

## 2 METHODOLOGY

Fieldwork for the assessment was undertaken by a Senior Technical Officer and Geotechnician from RGS on 20 June 2023 and included the following:

- Observation of site features and surrounding features relevant to the geotechnical conditions of the site;
- Logging and sampling of two boreholes within the proposed building footprint;
- Dynamic Cone Penetrometer (DCP) testing undertaken at one additional location; and
- Collection of samples for subsequent laboratory testing.

Engineering logs of the boreholes are attached. Test locations are shown on the attached Figure 1.



The test results are attached.

### 3 SITE CONDITIONS

The site is situated within a region of moderately to steeply sloping terrain that grades down to low lying areas beside Wallis Lake. The site is located on the lower eastern facing side of a prominent high point and associated ridgeline on the eastern side of Wallis Lake that contains the Green Point residential area.

The property occupies approximately 841m<sup>2</sup> and is bordered by other residential lots and Seabreeze Parade on the western side which provides access. The site was occupied by an old shed, concrete driveway, concrete slabs, fencing, old retaining walls and piers associated with previous structures. Reference to historical imagery shows that a dwelling previously existed on the western end of the site that has since been removed.

Areas of fill containing concrete rubble, bricks, and tyres are evident above a retaining wall. A stockpile of old building rubbish is evident on part of the site and a stockpile of tree limbs and organic matter was evident nearby the southern boundary. Vegetation comprised grass and trees that ranged from 6 – 20m in height. The slopes at the site have been modified by earthworks associated with the road construction and the previous building. The site slopes to the east at between 18 to 20 degrees on the upper portion, between 5 to 13 degrees on the mid-section and at 2 to 5 degrees on the lower end. The site drains by a combination of minor infiltration and surface runoff.

An image of the site taken from Google Maps showing the location of the site and the site setting is reproduced below.



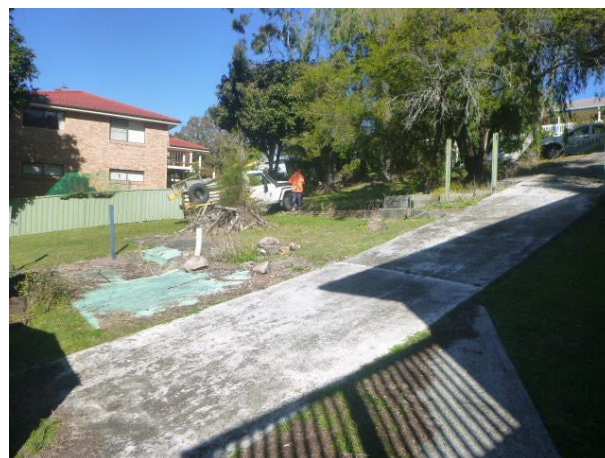
*Aerial image from Google Maps of subject site showing the approximate site boundary in red outline.*



Typical site photographs are presented below.



*Looking upslope towards the west over site showing moderately to gently sloping area, old shed, driveway and stockpiles.*



*Looking across and upslope to the south/southwest showing moderate slope, typical vegetation, small retaining walls and existing driveway.*

The site is underlain by the Boolambayte Formation which comprises sandstone, siltstone, mudstone, pebble conglomerate and minor limestone. These materials are typically overlain by residual clay soils derived from these rock types.

The subsurface profile encountered within the boreholes is summarised in Table 1.

**Table 1: Summary of Subsurface Profile Encountered in Boreholes**

Material Name	Material Description	Depth to base of Material Unit (m)	
		BH1	BH2
Topsoil	Sandy Silty CLAY/ Sandy Clayey SILT, low plasticity, soft to firm	0.15	0.2
Slopewash	Sandy CLAY, medium plasticity, stiff	0.25	--
Colluvium	Sandy Clayey SILT/ Sandy SILT, soft to firm	--	0.7
Residual	CLAY, medium to high plasticity, stiff	0.6	1.3
Extremely Weathered Siltstone	Clayey GRAVEL, fine to coarse grained, dense to very dense	≥0.7*	≥1.5*

Note:    ≥    Indicates that base of material layer was not encountered  
          --    Indicates that the material was not encountered at the test location  
          \*    indicates that the test was terminated due to practical refusal of tungsten carbide drill bit

Groundwater was not encountered in the boreholes. Groundwater levels fluctuate because of seasonal variations, temperature, rainfall and other similar factors, the influence of which may not have been apparent at the time of the assessment.



High moisture content was encountered in the colluvial soil encountered at BH2 and soil at that location was soft.

Laboratory testing on a representative sample of residual clay from BH2 (0.75 – 1.2m) indicates that the material has a shrink-swell index of 3.1%.

#### 4 SITE CLASSIFICATION

The site classification presented herein is provided on the basis that the performance expectations of AS2870-2011 are acceptable. In assessing the estimated characteristic surface movement ( $\gamma_s$ ) values the following has been adopted:

- Depth of design suction change of  $H_s=1.5\text{m}$ ;
- Crack depth multiplication factor of 0.5;
- Change in suction at design surface level of  $\Delta u=1.2$ ;
- Adopted shrink-swell index of 3.1% for the residual clay soils at the site;
- There are trees located on the subject property and neighbouring properties within the zone of influence to the proposed building footprint.
- Footings will extend through any uncontrolled fill to found in natural stiff clay soil.

The site is classified as **Class P** due to the presence of uncontrolled fill on the western end of the lot, low bearing capacity soils, nearby trees which may cause abnormal moisture conditions and existing footings that will cause disturbance to the site if removed. In accordance with AS2870-2011, residential footings on Class P sites must be designed in accordance with engineering principles based on specific site conditions.

Based on the above, the estimated shrink-swell related characteristic free surface movement for the estimated building footprint is up to **40mm**, similar to a Class M site. Additional shrink / swell related characteristic free surface movement ( $\gamma_t$ ) from the drying effects of nearby trees has been calculated and included in the total surface movement.

The founding of structures in differing materials is not recommended as differential movements, including shrink-swell related movements and settlement related movements can result in damage to the building. These movements can be accommodated by extending all footings to found within weathered rock.

Shrink-swell related movements can be affected by alterations to the soil profile by cutting and filling, and by the suction related effects of trees close to the building area. The effects of any such cutting, filling, tree planting, or tree removal should be taken into account when selecting design values for differential movement across the building.

The planting of trees and shrubs in the vicinity of the building will affect the moisture profile in the vicinity of the footings. Trees or shrubs should not be planted within a distance from the building equivalent to 1 times the height of the tree, measured from the nearest footing. Garden beds directly adjacent to footings will cause abnormal moisture conditions under the footings and should also be avoided.

If further site re-grading works are undertaken at the site, reclassification may be required.





## 5 FOOTINGS, CONSTRUCTION AND SITE MAINTENANCE CONSIDERATIONS

All structural footings should be founded as follows:

- All footings should be founded in residual clay or on weathered rock below all topsoil, slopewash, colluvial soil, uncontrolled fill and disturbed areas;
- Footings founded within residual clay of at least stiff strength ( $S_u \geq 50$ ) can be designed on the basis of a maximum allowable base bearing pressure of **100kPa**;
- Footings founded on weathered rock may be designed based on a maximum allowable bearing pressure of **400kPa**;
- All footings, edge beams and internal beams should be founded on similar materials and outside or below the zones of influence resulting from existing or future service trenches and other subsurface structures;
- Site drainage associated with the proposed development should be designed to avoid concentrated flows in the vicinity of any proposed cuttings and foundations and to discharge water to the drainage system in a controlled manner that limits erosion.
- The soils and rocks in the Green Point area are prone to fretting and softening on exposure to air and water. It is therefore recommended that concrete be poured as soon as possible after footing excavation. If wet weather or ground water inflows occur prior to pouring of concrete, the base of footing excavations should be checked for the presence of loose or softened material, which should be removed prior to pouring concrete.
- Earthworks may result in parts of the building being founded on or close to weathered rock and other parts on residual clay soils. In this case the building should be designed to allow for the predicted differential shrink-swell related movement or all footings extended to found on weathered rock.
- Any foundations located within areas where tree removals, earthworks or demolition works have previously been carried out or will occur in the future will need to be taken through the disturbed ground to be founded on the undisturbed natural ground beneath. All organic root material should be removed from within the building footprint.
- Where lot filling works are proposed, all fill for the support of structures should be placed and compacted in accordance with the recommendations outlined in AS3798-2007 *Guidelines on Earthworks for Residential and Commercial Developments*, under Level 1 supervision, for it to be considered Controlled Fill as defined in AS2870-2011. The founding of structures on fill that is not placed in accordance with Level 1 requirements is not recommended.

Site maintenance must comply with the recommendations and advice provided in CSIRO Sheet BTF18 "*Foundation Maintenance and Footing Performance: A Homeowners Guide*" a copy of which is available from the CSIRO website <http://www.publish.csiro.au/pid/7076.htm>

## 6 LIMITATIONS

This report comprises the results of an investigation carried out for a specific purpose and client as defined in the document. The report should not be used by other parties or for purposes or projects other than those assumed and stated within the report, as it may not contain adequate or appropriate information for applications other than those assumed or advised at the time of its preparation. The contents of the report are for the sole use of the client and no responsibility or



liability will be accepted to any third party. The report should not be reproduced either in part or in full, without the express permission of Regional Geotechnical Solutions Pty Ltd.

Geotechnical site investigation is based on data collection, judgment, experience, and opinion. By its nature, it is less exact than other engineering disciplines. The findings presented in this report and used as the basis for the recommendations presented herein were obtained using normal, industry accepted geotechnical design practises and standards. To our knowledge, they represent a reasonable interpretation of the general condition of the site. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

The recommended depth and properties of any soil, rock, groundwater, or other material referred to in this report is an engineering estimate based on the information available at the time of its writing. The estimate is influenced and limited by the fieldwork method and testing carried out in the site investigation, and other relevant information as has been made available. In cases where information has been provided to Regional Geotechnical Solutions for the purposes of preparing this report it has been assumed that the information is accurate and appropriate for such use. No responsibility is accepted by Regional Geotechnical Solutions for inaccuracies within any data supplied by others.

If site conditions encountered during construction vary significantly from those discussed in this report, Regional Geotechnical Solutions Pty Ltd should be contacted for further advice.

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any questions regarding this project, or require any additional consultations, please contact the undersigned.

For and on behalf of **Regional Geotechnical Solutions Pty Ltd**

Prepared by

**James Dowling**

Senior Technical Officer



Reviewed by

**Adam Holzhauser**

Principal Geotechnical Engineer

Attachments:    Figure 1 – Borehole Location Plan  
                          Borehole Logs  
                          Laboratory Test Result Sheet



Legend	
	Borehole Location
	DCP Location



<b>Client:</b> <b>Project:</b> <b>Title:</b>	Coast Building Company	Job No.	RGS03366.1
	Proposed Dwelling	Drawn By:	JD
	80 Seabreeze Parade, Green Point	Scale:	NTS
	Borehole Location Plan	Date:	20-Jul-23
		Drawing No.	<b>Figure 1</b>

BOREHOLE NO: **BH1**

**CLIENT:** Coast Building Company

PAGE: 1 of 1

**PROJECT NAME:** Proposed Dwelling

**JOB NO:** RGS03366.1

**SITE LOCATION:** 80 Seabreeze Parade, Greenpoint

LOGGED BY: JD

**TEST LOCATION:** Refer to Figure 1

**DATE:** 20/6/23

DRILL TYPE: RGS Ute Mounted Drill Rig

**EASTING:**

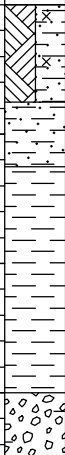
**SURFACE RL:**

**BOREHOLE DIAMETER:** 100 mm

**INCLINATION:** 90°




**NORTHING:**

DATUM: AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	
AD/T	Not Encountered				CL	0.15m	<b>TOPSOIL:</b> Sandy Silty CLAY low plasticity, dark brown, sand fine to medium grained, trace of gravel fine to medium grained.	$M > w_p$	St	HP	140	TOPSOIL
					CI	0.25m	<b>Sandy CLAY:</b> medium plasticity, pale brown, brown, sand fine to medium grained.				140	SLOPEWASH
					CH		<b>CLAY:</b> medium to high plasticity, brown, pale brown, orange brown, grey with some sand fine to medium grained, trace of gravel fine to medium grained.				200	RESIDUAL
											220	
					HP	250						
					GC	0.60m	<b>Clayey GRAVEL:</b> fine to coarse grained, grey, dark grey, blue grey, clay medium plasticity with some sand fine to medium grained.	M	D to VD		EXTREMELY WEATHERED SILTSTONE	
						0.70m	Hole Terminated at 0.70 m Practical refusal on Rock					
						0.8						
						1.0						
						1.2						
						1.4						
						1.6						
						1.8						

**LEGEND:**

## Water

-  Water Level  
(Date and time shown)
-  Water Inflow
-  Water Outflow

### Strata Changes

- — Gradational or transitional strata  
—— Definitive or distinct strata change

### Notes, Samples and Tests

- |                 |                             |
|-----------------|-----------------------------|
| U <sub>50</sub> | 50mm Diameter tube sample   |
| CBR             | Bulk sample for CBR testing |
| E               | Environmental sample        |
| ASS             | Acid Sulfate Soil Sample    |
| B               | Bulk Sample                 |

## Field Tests

- |          |   |
|----------|---|
| PID      | Photoionisation detector reading (ppm)                |
| DCP(x-y) | Dynamic penetrometer test (test depth interval shown) |
| HP       | Hand Penetrometer test (UCS kPa)                      |

**Consistency**

- |     |            |           |
|-----|------------|-----------|
| VS  | Very Soft  | <25       |
| S   | Soft       | 25 - 50   |
| F   | Firm       | 50 - 100  |
| St  | Stiff      | 100 - 200 |
| VSt | Very Stiff | 200 - 400 |
| H   | Hard       | >400      |
| Fb  | Frangible  |           |

UCS (kPa)
-----------

- |     |            |           |
|-----|------------|-----------|
| VS  | Very Soft  | <25       |
| S   | Soft       | 25 - 50   |
| F   | Firm       | 50 - 100  |
| St  | Stiff      | 100 - 200 |
| VSt | Very Stiff | 200 - 400 |
| H   | Hard       | >400      |
| Fb  | Frangible  |           |

## Moisture Condition

- |       |               |
|-------|---------------|
| D     | Dry           |
| M     | Moist         |
| W     | Wet           |
| $W_p$ | Plastic Limit |
| $W_L$ | Liquid Limit  |

## Density

- | Density |              |                         |  |
|---------|--------------|-------------------------|--|
| V       | Very Loose   | Density Index <15%      |  |
| L       | Loose        | Density Index 15 - 35%  |  |
| MD      | Medium Dense | Density Index 35 - 65%  |  |
| D       | Dense        | Density Index 65 - 85%  |  |
| VD      | Very Dense   | Density Index 85 - 100% |  |





## ENGINEERING LOG - BOREHOLE

BOREHOLE NO: **BH2**

CLIENT: Coast Building Company

PAGE: 1 of 1

PROJECT NAME: Proposed Dwelling

JOB NO: RGS03366.1

SITE LOCATION: 80 Seabreeze Parade, Greenpoint

LOGGED BY: JD

TEST LOCATION: Refer to Figure 1

DATE: 20/6/23

DRILL TYPE: RGS Ute Mounted Drill Rig

EASTING:

SURFACE RL:

BOREHOLE DIAMETER: 100 mm

INCLINATION: 90°

NORTHING:

DATUM:

AHD

Drilling and Sampling					Material description and profile information					Field Test		Structure and additional observations				
METHOD	WATER	SAMPLES	RL (Not measured)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics, colour, minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result					
AD/T	Not Encountered	0.75m		0.2		ML	<b>TOPSOIL:</b> Sandy Clayey SILT, low plasticity, dark brown, black, sand fine to medium grained, trace of roots.		S to F			TOPSOIL				
				0.20m		ML	<b>Sandy Clayey SILT:</b> low plasticity, dark brown, black, sand fine to medium grained.	M > w <sub>p</sub>	F			COLLUVIUM HP=50-70kPa				
				0.4		ML	<b>Sandy SILT:</b> low plasticity, pale brown, sand fine to medium grained.	M > w <sub>p</sub>	S			HP=<10kPa Wet Silt but no water in hole				
				0.50m			0.6	0.70m	CH			<b>CLAY:</b> medium to high plasticity, grey, pale grey, orange brown mottling with some sand fine to medium grained.	M > w <sub>p</sub>	St	RESIDUAL	
		1.20m		0.8									HP	170		EXTREMELY WEATHERED SILTSTONE
				1.0									HP	150		
											HP	120				
											1.2	HP	180			
											HP	200				
											1.4	HP	240			
				1.6			Hole Terminated at 1.50 m Practical refusal on Rock									
				1.8												

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)		Moisture Condition	
<b>Water</b>		U <sub>50</sub> 50mm Diameter tube sample		VS	Very Soft	<25		D	Dry
Water Level (Date and time shown)		CBR Bulk sample for CBR testing		S	Soft	25 - 50		M	Moist
Water Inflow		E Environmental sample		F	Firm	50 - 100		W	Wet
Water Outflow		ASS Acid Sulfate Soil Sample		St	Stiff	100 - 200		w <sub>p</sub>	Plastic Limit
<b>Strata Changes</b>		B Bulk Sample		VSt	Very Stiff	200 - 400		w <sub>L</sub>	Liquid Limit
Gradational or transitional strata				H	Hard	>400			
Definitive or distinct strata change				Fb	Friable				
		<b>Field Tests</b>		<b>Density</b>					
		PID Photoionisation detector reading (ppm)		V		Very Loose		Density Index <15%	
		DCP(x-y) Dynamic penetrometer test (test depth interval shown)		L		Loose		Density Index 15 - 35%	
		HP Hand Penetrometer test (UCS kPa)		MD		Medium Dense		Density Index 35 - 65%	
				D		Dense		Density Index 65 - 85%	
				VD		Very Dense		Density Index 85 - 100%	

## Dynamic Cone Penetrometer

Project Number: RGS03366.1

Date: 21/7/23

Client	Coast Building Company
Project	Proposed Dwelling
Location	80 Seabreeze Parade, Green point

Test Details:

Hammer Mass: 9kg

Rod Tip: Cone

Test as per AS1289 6.3.2

Hammer drop: 510mm

Depth to groundwater:

Surface Level

Depth to base of test section (mm)	Test Number and blows recorded per 100mm							Comments (soil type, general information)
	DCPA							
0 - 100	2							
200	4							
300	6							
400	3							
500	2							
600	2							
700	1							
800	2							
900	4							
1000	3							
1100	7							
1200	14							
1300	20/R							
1400								
1500								
1600								
1700								
1800								
1900								
2000								
2100								
2200								
2300								
2400								
2500								
2600								
2700								
2800								
2900								

**Report No: SSI:NEW23W-3074-S01**

**Issue No: 1**

# Shrink Swell Index Report

**Client:** Regional Geotechnical Solutions Pty Ltd  
 44 Bent Street  
 Wingham NSW 2429

**Project No.:** MNC16P-0001

**Project Name:** Various Testing

**Project Location:** 80 Seabreeze Parade, Green Point, NSW



Accredited for compliance with ISO/IEC 17025 - Testing.  
 Results provided relate only to the items tested or sampled.  
 This report shall not be reproduced except in full.

*B. Cullen*

Approved Signatory: Brent Cullen  
 (Engineering Geologist)  
 NATA Accredited Laboratory Number: 18686  
 Date of Issue: 7/07/2023

## Sample Details

**Sample ID:** NEW23W-3074-S01

**Test Request No.:** RGS03366.1

**Sampling Method:** The results outlined below apply to the sample as received

**Material:** Clay

**Date Sampled:** 22/06/2023

**Source:** On-Site Insitu

**Date Submitted:** 26/06/2023

**Specification:** No Specification

**Sample Location:** BH2 - (0.75 - 1.20m)

**Date Tested:** 3/07/2023

### Swell Test

**AS 1289.7.1.1**

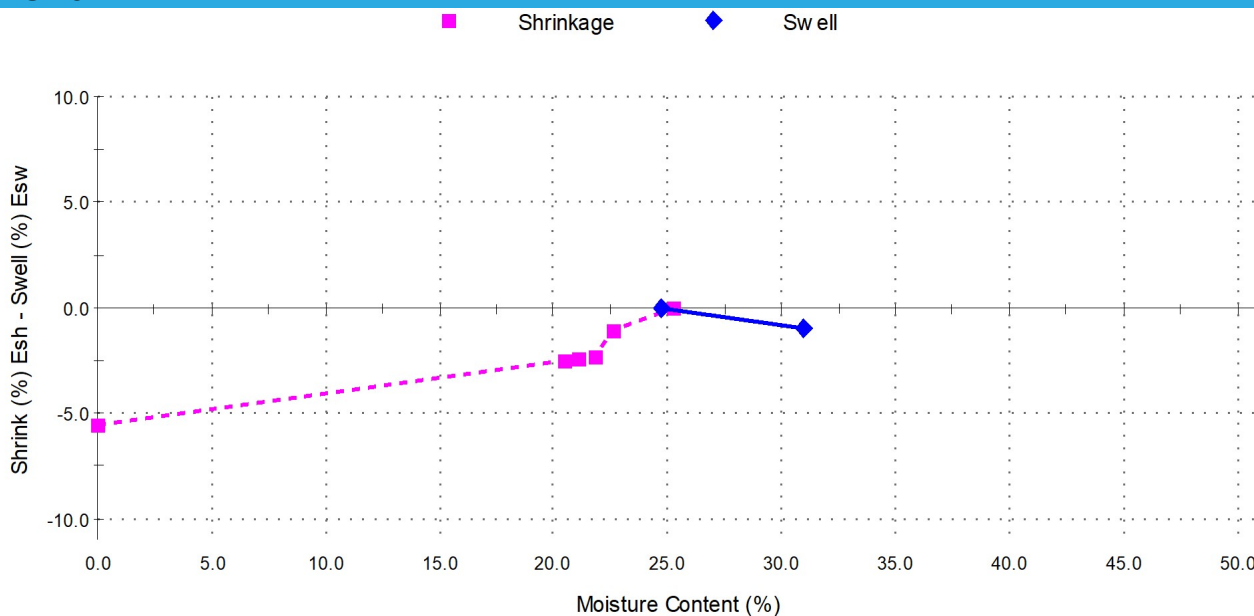
**Swell on Saturation (%):** -1.0  
**Moisture Content before (%):** 24.7  
**Moisture Content after (%):** 30.9  
**Est. Unc. Comp. Strength before (kPa):** 220  
**Est. Unc. Comp. Strength after (kPa):** 250

### Shrink Test

**AS 1289.7.1.1**

**Shrink on drying (%):** 5.6  
**Shrinkage Moisture Content (%):** 25.2  
**Est. inert material (%):** 1%  
**Crumbling during shrinkage:** Nil  
**Cracking during shrinkage:** Nil

## Shrink Swell



**Shrink Swell Index - Iss (%): 3.1**

## Comments