

FIG

# FIG WORKING WEEK 2017

Helsinki Finland

29 May - 2 June 2017

Presented at the FIG Working Week 2017,  
May 29 - June 2, 2017 in Helsinki, Finland



Surveying the world of tomorrow -  
From digitalisation to augmented reality

Organised by



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## 3D Cadastral Parcels in South Africa Representing the Third Dimension in the South African Cadastral System

Lara Humby

Supervised by Associate Professor Jennifer Whittal

University of Cape Town  
South Africa



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## The Need for 3D in South Africa

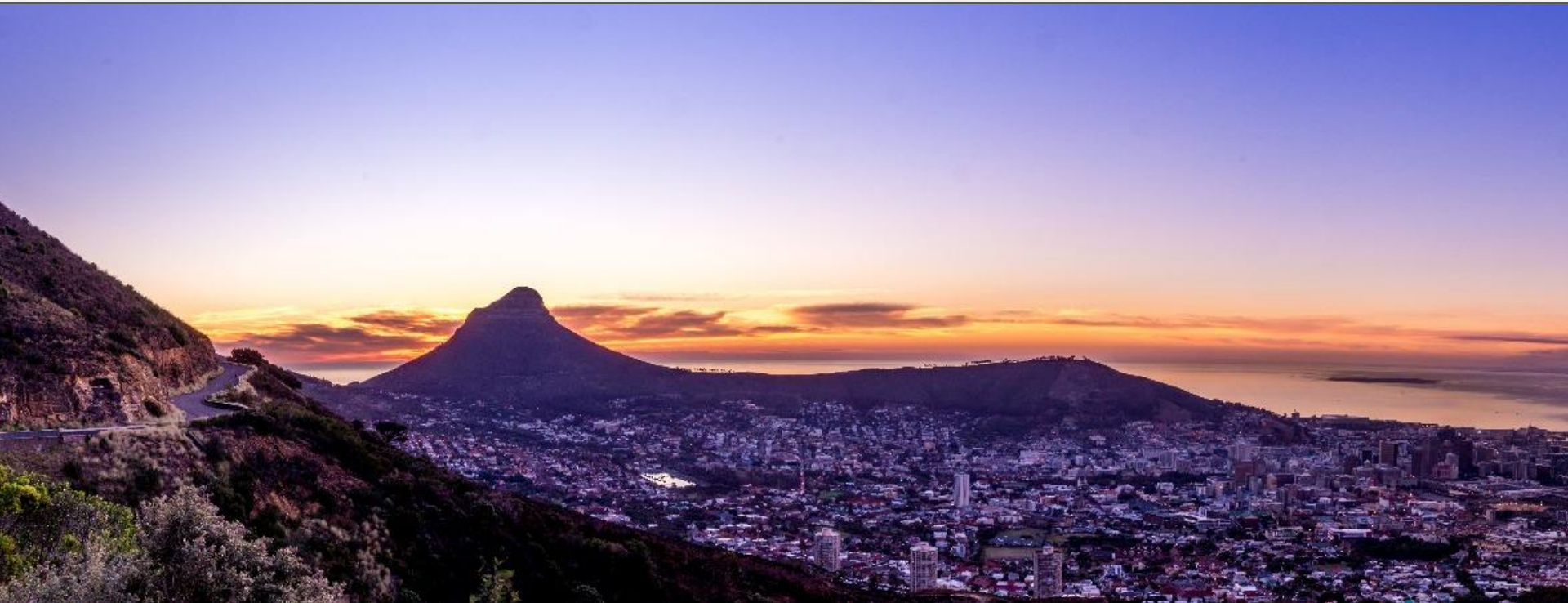


Photo Credit: Ian Gallaher



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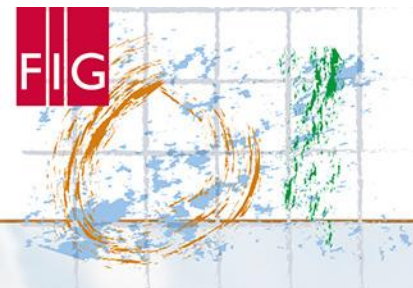
## The International Need for 3D

- ❑ Increased Need for Development Space
- ❑ Increasingly Complex Urban Environments
- ❑ Previously unseen RRR Objects - capture with Clarity
- ❑ Increase Tenure Security + Attract Investment
- ❑ Improve Land Use Management + Planning



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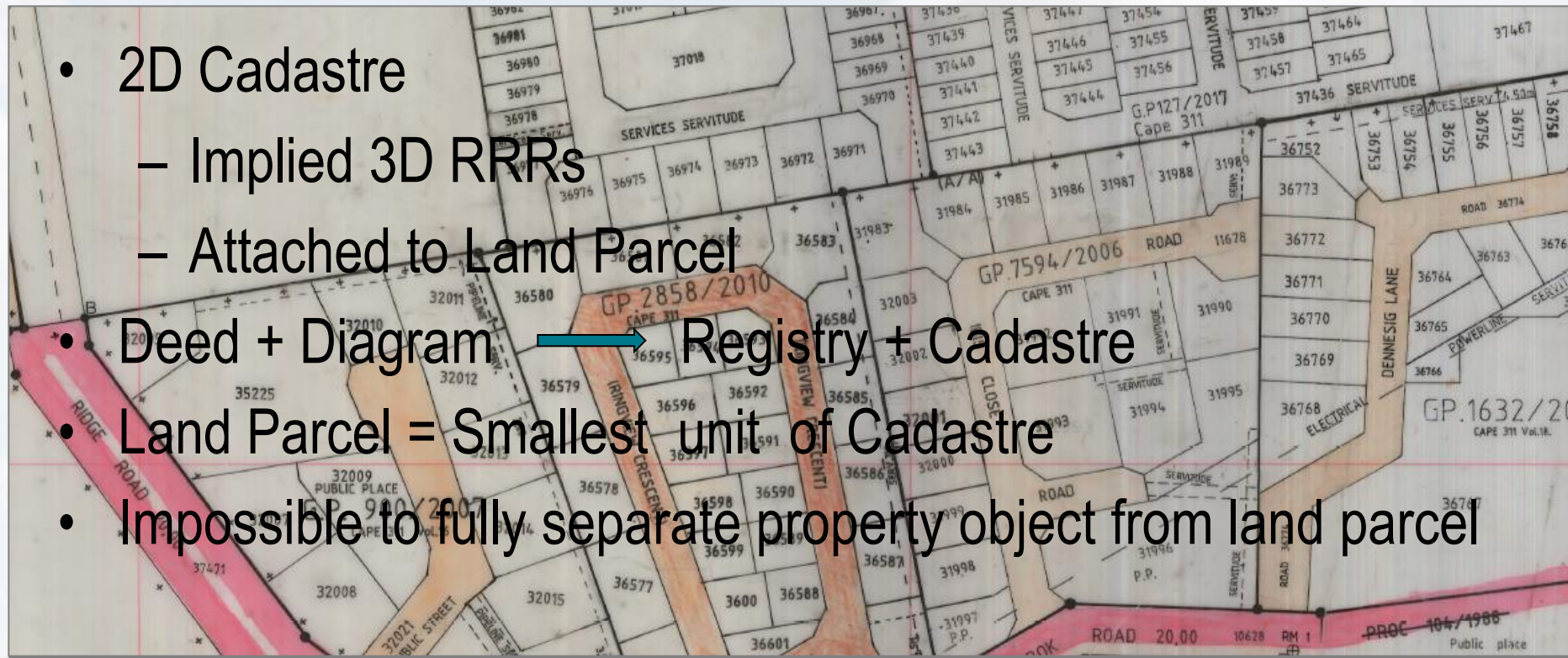
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## An Introduction to South African Property Law

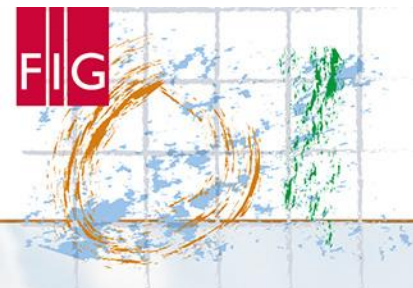
- 2D Cadastre
  - Implied 3D RRRs
  - Attached to Land Parcel
- Deed + Diagram → Registry + Cadastre
- Land Parcel = Smallest unit of Cadastre
- Impossible to fully separate property object from land parcel



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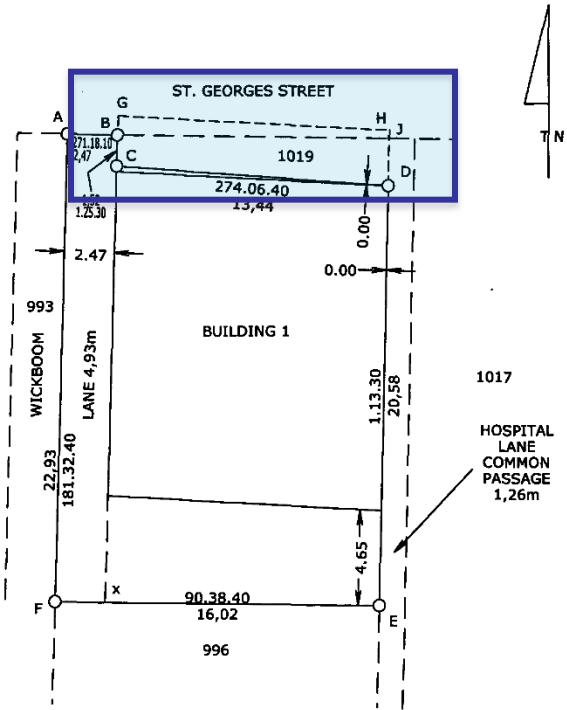
<b>Legal Tool</b>	<b>Limitations of this Tool</b>
Condition Clause	<ul style="list-style-type: none"><li>- No geometric record of the property object</li><li>- Create complex, inaccessible title deed</li></ul>
Sectional Title Act	<ul style="list-style-type: none"><li>- Works well, but issues arise when defining participation quota</li><li>- Land is inherently tied to sectional title</li></ul>
Servitudes	<ul style="list-style-type: none"><li>- minor right in comparison with ownership</li><li>- no independence of ownership</li></ul>
Leasehold	<ul style="list-style-type: none"><li>- Timely to create and impermanent</li><li>- Dependent on surface parcel owner</li></ul>



## Case Study 1: Malawi House



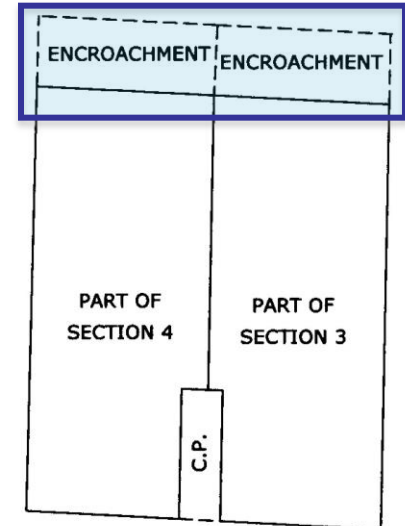
SHEET 2 OF 6 SHEETS	S.G. No. D 844/2008
Approved <i>S. van der Berg</i> for Surveyor-General	26 JAN 2009 Date



ENCROACHMENT DATA:		
SIDES	METRES	DIRECTIONS
BG	0,93	181 25 30
GH	13,42	272 58 10
HJ	0,39	1 13 30
JB	13,41	90 39 20
JD	2,32	1 13 30

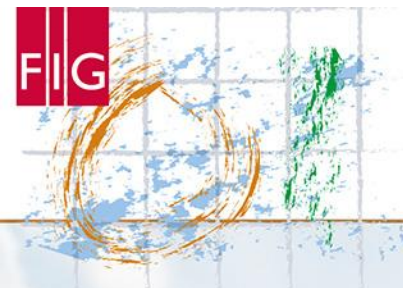
NOTES: 1. THE FIGURE ABCDEF REPRESENTS REMAINDER ERF 992 SIMON'S TOWN.  
 2. ALL MEASUREMENTS ARE GIVEN IN METRES.  
 3. - - - - DENOTES PROJECTIONS ABOVE GROUND FLOOR LEVEL BEYOND EXTERNAL SURFACES OF BUILDINGS AT GROUND LEVEL.  
 4. THE FIGURE BGHJ REPRESENTS A BALCONY OVERHANG ENCROACHMENT OVER ST. GEORGES STREET, 9 SQUARE METRES IN EXTENT.  
 5. THE FIGURE BJDC REPRESENTS A BALCONY OVERHANG ENCROACHMENT OVER ERF 1019 SIMON'S TOWN, 26 SQUARE METRES IN EXTENT.  
 6. BEACON DESCRIPTIONS: A - 12mm ROUND IRON PEG; B, G, F - 12mm DRILL HOLE IN BRICK; D, E, G, H - WALL CORNER; J - NO BEACON.  
 7. THE LINE Bx REPRESENTS THE EASTERN BOUNDARY OF WICKBOOM LANE.  
 8. FOR EXCLUSIVE USE AREAS, SEE SHEET 3.

D.H. BATES LAND SURVEYOR 107 ARCADE OFFICES 110 MAIN ROAD FISH HOEK, 7975 5/12/2009 DATE	SIGNED <i>[Signature]</i>	STEWART & ENGLE MALAWY HOUSE. DRAWING TITLE: BLOCK PLAN SCALE: 1/200
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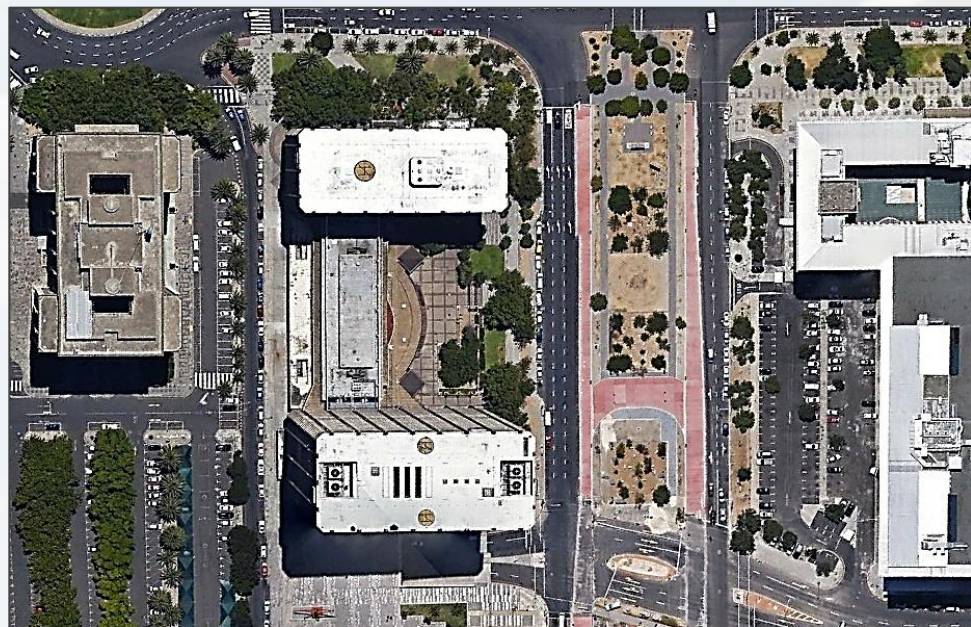


FIRST FLOOR PLAN





## Case Study 2: Standard Bank Building



Images courtesy of Google Earth

K A HODGE Land Surveyors (V1721302)

SIDES metres		ANGLES OF DIRECTION		CO-ORDINATES Y System WG 19° X	
		CONSTANTS		+0.00	+3700000,00
AB	5,41	220 38 00	A	+ 52 979,45	+ 54 895,15
BC	1,99	310 38 00	B	+ 52 975,93	+ 54 891,05
CD	4,97	220 38 00	C	+ 52 974,41	+ 54 892,35
DE	54,53	310 38 00	D	+ 52 971,18	+ 54 888,58
EF	4,97	40 38 00	E	+ 52 929,80	+ 54 924,09
FG	1,84	310 38 00	F	+ 52 933,03	+ 54 927,86
GH	5,41	40 38 00	G	+ 52 931,64	+ 54 929,05
HA	58,36	130 38 00	H	+ 52 935,16	+ 54 933,16
SERVITUDE DATA:					
JC	0,13	220 38 00	J	+ 52 974,50	+ 54 892,45
FK	0,19	40 38 00	K	+ 52 933,16	+ 54 928,00
CONNECTING DATA:					
AL	2,96	130 38 00	L	+ 52 981,70	+ 54 893,23
HM	3,14	310 38 00	M	+ 52 932,78	+ 54 935,20
HEIGHT : METRES ABOVE MEAN SEA LEVEL					
	3,33	18 J 6	⊕	+ 52 889,38	+ 54 652,80
	3,72	29 J 6	⊕	+ 52 811,65	+ 54 908,08

BEACON DESCRIPTIONS:

A, B, G, L, M ... 12mm Round Iron peg  
 C, D, E, F, H, J, K ... 12mm Drill hole in concrete

S.G. No.

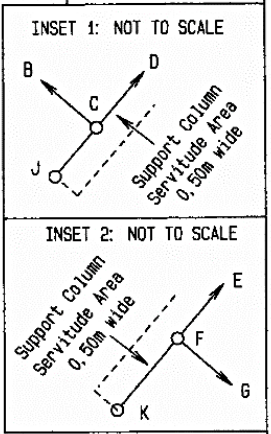
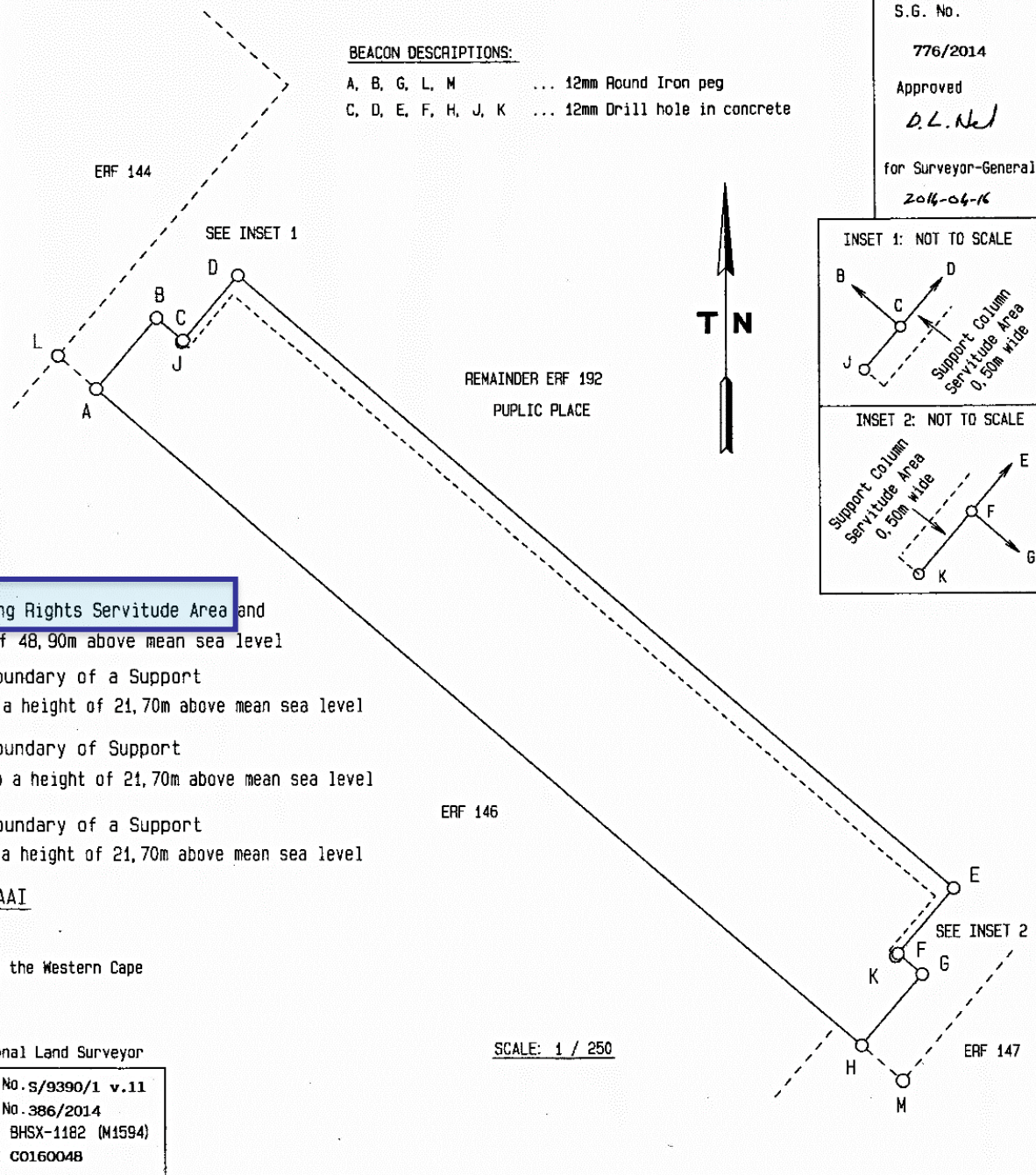
776/2014

Approved

*D.L. Nel*

for Surveyor-General

2014-04-16



1. The figure A, B, C, D, E, F, G, H represents a **Building Rights Servitude Area** and extends from a height of 21,70m to a height of 48,90m above mean sea level
2. The line JD represents the north western boundary of a Support Column Servitude Area 0,50m wide and extends to a height of 21,70m above mean sea level
3. The line DE represents the north eastern boundary of Support Columns Servitude Area 1,05m wide and extends to a height of 21,70m above mean sea level
4. The line EK represents the south eastern boundary of a Support Column Servitude Area 0,50m wide and extends to a height of 21,70m above mean sea level

OVER REMAINDER ERF 192 ROGGEBAAI

situate in the City of Cape Town  
 Administrative District of CAPE Province of the Western Cape  
 Surveyed in February 2012 - March 2014

by me, *K A Hodge* K A Hodge (PLS 0267) Professional Land Surveyor

This diagram is annexed to No. dated i.f.o. Registrar of Deeds	The original diagram is No. 3661/1952 annexed to Transfer No. 1953. 79 .3938	File No.s/9390/1 v.11 S.R. No.386/2014 Comp. BHSX-1182 (M1594) LPI C0160048
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SCALE: 1 / 250

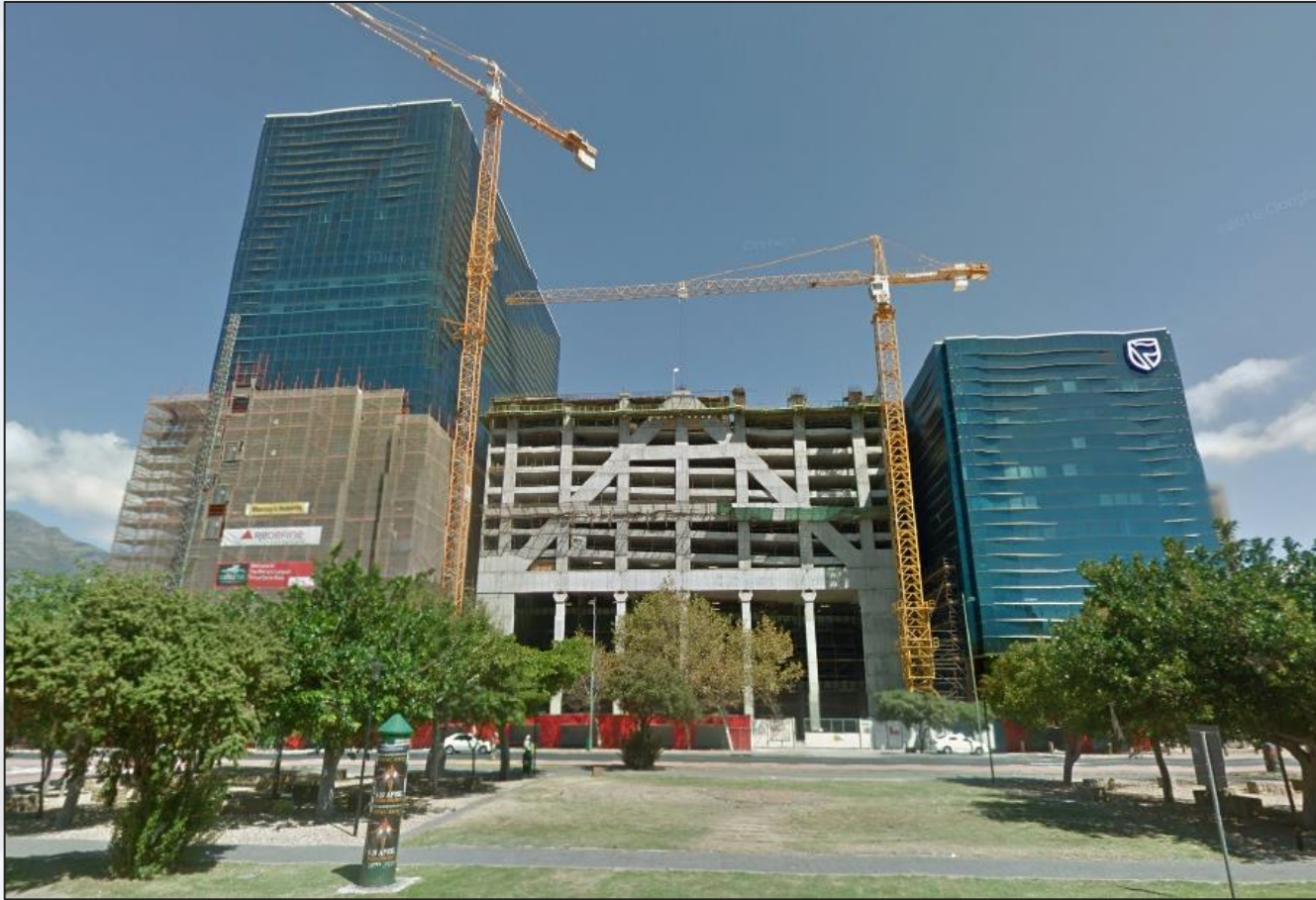


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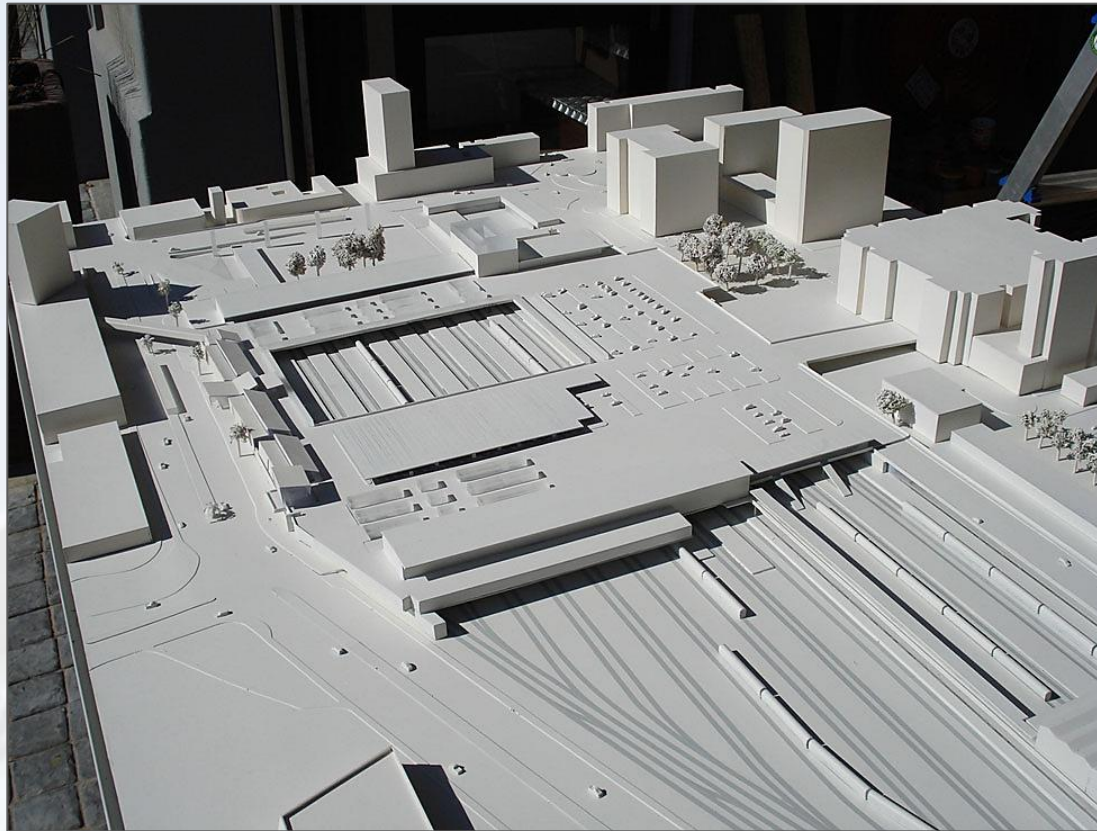


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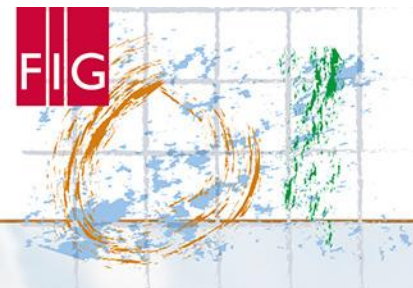




## The Need for 3D in South Africa



*3D Cape Town CBD courtesy of the City of Cape Town*



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**Many thanks to my funders:**

The South African Geomatics Institute



&

The Confederation of Southern African Surveyors  
(the CONSAS Foundation)



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