

CHAPTER 5

5.0 COSTING, SUMMARY, RECOMMENDATION AND CONCLUSION.

5.1 Cost Estimation of the Project

The project costing was based on number of variables which includes area to be covered, instruments, personnel, transportation and so on. However, another critical factor to be considered is the time duration in which the project was executed. The table below shows the duration the project was accomplished.

Table 5.1: Scheduled and Duration of the Project Execution

Description	Duration (Days)
Reconnaissance	1
Beaconing / Monumentation	1
Spot height points establishment	1
XYZ acquisition of the spot height points (using TS)	1
Height observation of the spot height points (using level instrument)	1
Detailing (using handheld GPS)	1
Data Downloading / Processing	3

Plotting and Report Writing	7
Submission of Report and Plan	5
Total No. of Days Spent for the Project	21

5.1.1 Project Costing Breakdown

Costing of this project was based on Professional Scale of Fees as approved by Nigerian Institution of Surveyor (NIS) in 2017 using 1996 Federal Government Approved Scale of Fees for Consultants in the Construction Industry. The prevailing inflation rate as at February 2023 was 21.91 % and this was applied to the cost estimate.

Table 5.2: Worked out Calculation for the grand Total Cost

S/N	OPERATION	RATE/DAY	NO OF DAYS	UNIT COST (#)	AMOUNT (#)
1	RECONNAISSANCE(1 DAY)				
	4 Technician	15,189.11	1	15,189.11 x 4	60,756.40
	1 Skilled Labour	9,468.61	1	9,468.61x 1	9,468.61

	Transportation (Field vehicle + Driver / Mechanic + fuel	46,027.61	1	46,027.61 x 1	46,027.61
	Basic equipment (Hand held GPS etc.)	46,027.61	1	46,027.61 x 1	46,027.61
	SUB TOTAL				157,546.00
2	(A) BEACONS (5) (standard Cadastral Beacon)	5,000 per Beacon		5,000 x 5	25,000.00
	(B) BEACONING/ MONUMENTATION (1 day)				
	6 Surveyors	15,189.11	1	6x 15,189.11x 1	91,134.11
	3 Skilled Labour	9,468.61	1	3x 9,468.61x 1	28,405.83
	Transportation (Field vehicle + Driver / Mechanic + fuel)	46,027.61	1	46,027.61 x 1	46,027.61

	Basic tools (Crow bar, Trowel, Shovel etc)	13,929.00	1	13,929.00x 1	13,929.00
	SUBTOTAL				179,496.55
3	Spot Height Establishment (1 DAY)				
	2 surveyors	15,189.11	1	2x15,189.11 x 1	30,378.22
	3 Unskilled Labour	9,468.61	1	3 x9,468.61x 1	56,811.66
	Basic Equipment	46,027.61	1	46,027.61x1	92,055.22
	Transportation (Field vehicle + Driver / Maintenance + Fuel)	46,027.61	1	46,027.61 x 1	92,055.22
	SUBTOTAL				271,300.32
4	XYZ ACQUISITION USING (TS) (1 DAY)				

	1 Senior Surveyor	22,783.67	1	1x 22,783.67 x 2	45,567.34
	2 Surveyors	15,189.11	1	2 x15,189.11 x 2	60,756.44
	2skilled Labour	9,468.61	1	2 x9,468.61x 2	37,874.44
	Basic Equipment	46,027.61	1	46,027.61x 2	92,055.22
	Transportation (Field vehicle + Driver / Maintenance + Fuel)	46,027.61		46,027.61 x 2	92,055.22
	SUBTOTAL				328,308.66
5	HEIGHT OBSERVATION (LEVEL INSTRUMENT) (1DAY)				
	1 Senior Surveyor	22,783.67	1	1x 22,783.67 x 2	45,567.34
	2 surveyors	15,189.11	1	2 x15,189.11 x 2	60,756.44

	2skilled Labour	9,468.61	1	2 x9,468.61x 2	37,874.44
	Basic Equipment	46,027.61	1	46,027.61x 2	92,055.22
	Transportation (Field vehicle + Driver / Maintenance + Fuel)	46,027.61	1	46,027.61 x 2	92,055.22
	SUBTOTAL				328,308.32
6	DETAILING (1 DAY)				
	2 Surveyors	15,189.11	1	2x 15,189.11x 1	30,378.22
	3 Skilled Labour	9,468.61	1	3x 9,468.61x 1	28,405.83
	Transportation (Field vehicle + Driver / Mechanic + fuel)	46,027.61	1	46,027.61 x 1	46,027.61
	Basic Equipment	46,027.61	1	46,027.61x 1	46,027.61
	SUBTOTAL				150,839.27

7	DATA DOWNLOADING / PROCESSING (3 DAYS)				
	1 Senior Surveyor	22,783.67	3	22,783.67 x 3	68,351.01
	2 surveyors	15,189.11	3	2x15,189.11 x 3	91,134.66
	Computer Accessories	49,315.28	3	49,315.28 x 3	147,945.84
	SUBTOTAL				307,431.51
8	PLOTTING AND REPORT WRITTING (7 DAYS)				
	1 Senior Surveyor	22,783.67	7	1x22783.67 x 7	159,485.69
	2 surveyors	15,189.11	7	2x15,189.11 x 7	212,647.54
	Standard set (computer, plotter etc)	65,753.70	7	1x65,753.70 x 7	460,275.90

	SUBTOTAL				832,409.13
9	SUBMISSION OF REPORT AND PLAN (1 DAY)				
	1 Chief Surveyor	30,800.00	1	30,800.00x 1	30,800.00
	2 surveyors	15,189.11	1	2x 15,189.11x 1	30,378.22
	1 Computer	46,027.61	1	46,027.61 x 1	46,027.61
	Consumables	13,929.00	1	13,929.00 x 1	13,929.00
	SUBTOTAL				121,135.41
COST OF THE PROJECT =					2,676,775.17
ACCOMODATION (15% of the cost of the project)					595,177.22
MOBILIZATION/DEMOBILIZATION (10% of cost of the project) =					396,784.81
CONTINGENCIES (5% of cost of the project) =					198,392.41

VAT (7.5% of the Total cost of the project)=	297,588.61
ACTUAL BILL/ GRAND TOTAL =	4,164,718.22

Hence, the total cost of expenditure used for comparative evaluation of digital levelling and total station equipment for height measurement project was estimated to be Four Million, One Hundred and Sixty Four Thousand, Seven Hundred Eighteen Naira, Twenty Two Kobo only.

5.2 Summary

This project presents a comprehensive comparative evaluation of the accuracy and reliability of digital levelling and total station equipment for determining height measurements. The project reveals that both tools have distinct strengths and limitations, with digital levelling offering high precision and accuracy in precise levelling tasks, and total station equipment providing flexibility and versatility in various surveying applications. The results demonstrate that the choice between these two tools depends on the specific requirements of the project, including the range, precision, and type of measurement. The project's findings have significant implications for surveying professionals, researchers, and engineers, providing a deeper understanding of the capabilities and limitations of digital levelling and total station equipment.

5.3 Recommendation

Based on the findings of this study, it is recommended that surveying professionals and researchers consider the environmental conditions and potential sources of error when

selecting and using digital levelling and total station equipment. By understanding the potential sources of error and taking steps to mitigate them, professionals can ensure the accuracy and reliability of height measurements. Additionally, it is recommended that professionals use multiple measurement techniques and equipment to validate results and ensure accuracy.

5.4 Conclusion

In conclusion, this project has provided a comprehensive assessment of the accuracy and reliability of digital levelling and total station equipment for determining height measurements. The results demonstrate that both tools have distinct strengths and limitations, with digital levelling offering high precision and accuracy, and total station equipment providing flexibility and versatility. By understanding these characteristics, surveying professionals can make informed decisions, selecting the most suitable equipment for specific projects. Ultimately, this study contributes to the advancement of surveying practices, enhancing the accuracy and reliability of height measurements and informing the development of more effective surveying methodologies.

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APPENDIX

ID	EASTING	NORTHING	TS HEIGHT	LEVEL HEIGHT
PL.1	680428.567	946558.865	356.128	
PL.2	680417.004	946286.792	354.746	
PL.3	680171.885	946294.956	353.013	
PL.4	680205.833	946686.334	357.652	
PL.5	680380.567	946678.865	356.849	
SH1	680272.275	946497.781	355.749	355.715
SH2	680267.717	946479.907	356.403	356.362
SH3	680273.327	946450.469	354.811	354.772
SH4	680287.358	946434.349	354.268	354.208
SH5	680317.873	946433.648	355.036	354.984
SH6	680304.544	946455.727	355.710	355.668
SH7	680337.867	946463.436	355.448	355.386
SH8	680342.774	946441.708	356.295	356.240
SH9	680342.774	946441.708	356.736	356.680
SH10	680348.740	946443.460	355.971	355.931
SH11	680377.262	946451.836	355.725	355.673
SH12	680382.060	946482.711	355.318	355.277
SH13	680381.009	946518.108	354.819	354.766
SH14	680350.494	946509.345	355.174	355.128
SH15	680356.104	946484.813	355.033	355.005
SH16	680332.603	946480.960	355.228	355.188
SH17	680298.581	946490.422	355.834	355.802
SH18	680318.222	946506.191	355.726	355.678
SH19	680308.753	946526.168	356.148	356.096

SH20	680342.774	946441.708		356.736		356.680
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SHOPRITE	680275.567	946584.865	,	S.G.I	680364.567	946630.865
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SHOPRITE	680229.567	946585.865	,	S.G.I	680368.567	946658.865
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SHOPRITE	680218.567	946585.865	,	S.G.I	680360.567	946661.865
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SHOPRITE	680214.567	946661.865	,	S.G.I	680347.567	946661.865
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SHOPRITE	680262.006	946660.833	,	S.G.I	680346.567	946659.865
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SHOPRITE	680264.633	946610.907	,	S.G.I	680348.567	946639.865
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SHOPRITE	680269.493	946616.306	,	S.G.I	680348.567	946630.865
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SHOPRITE	680281.021	946610.551	,	S.G.I	680364.567	946630.865
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SHOPRITE	680281.021	946610.551				
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DRCT. IES	680344.567	946584.865	,	BLD&QS	680371.567	946581.865
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DRCT. IES	680343.551	946601.098	,	BLD&QS	680370.514	946603.802
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DRCT. IES	680352.430	946601.591	,	BLD&QS	680401.497	946607.815
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DRCT. IES	680352.329	946603.210	,	BLD&QS	680404.537	946602.905
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DRCT. IES	680361.208	946603.703	,	BLD&QS	680402.499	946585.830
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ARC&URP	680328.567	946604.865	,	BFM	680262.567	946521.871
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ARC&URP	680292.567	946602.865	,	BFM	680267.567	946509.867
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ARC&URP	680293.684	946585.013	,	BFM	680279.567	946513.862
ARC&URP	680329.684	946587.013	,	BFM	680274.567	946525.865
MKT.	680215.442	946426.097	,	ACCT.	680262.660	946428.209
MKT.	680214.930	946436.134	,	ACCT.	680218.483	946419.645
MKT.	680263.075	946445.466	,	ACCT.	680218.891	946411.655
MKT.	680263.587	946435.430	,	ACCT.	680263.068	946420.219
PHYS.	680266.105	946405.563	,	OTM.	680266.988	946386.384
PHYS.	680267.046	946394.755	,	OTM.	680218.393	946380.018
PHYS.	680218.331	946387.08	,	OTM.	680221.571	946372.409
PHYS.	680217.389	946397.897	,	OTM.	680270.166	946378.775
PAD.	680240.402	946321.660				
PAD.	680215.235	946320.874				
PAD.	680218.077	946335.465				
PAD.	680243.244	946336.252				