



SABARAGAMUWA UNIVERSITY OF SRI LANKA

ACADEMIC YEAR 2019/2020, YEAR II - SEMESTER II

FACULTY OF GEOMATICS

DEPARTMENT OF SURVEYING AND GEODESY

**GROUPS FOR FIELD PRACTICAL PROGRAMME**

**GROUP 01**

19GES1123 ABILAKSHAN V. Mr.  
19GES1140 DINUSHANTH S. Mr.  
19GES1145 GAMAGE B.G.S.S. Mr.  
19GES1159 JAYASINGHE J.A.S.V. Mr.  
19GES1175 LIYANAGE I.U. Mr.  
19GES1184 MUSTHAK M.N.M.S. Mr.  
19GES1218 WANSADAYA A.K.T.L. Mr.  
19GES1224 WIJESUNDARA W.M.T.C.B. Mr.  
19GES1237 JAYAWARDHANE U.P. Ms.  
19GES1241 MADAGAMMANA K.K.N.N. Ms.  
19GES1261 THARSIGA S. Ms.

**GROUP 02**

19GES1146 GOBIRAJH T. Mr.  
19GES1147 GUNASEKARA S.A. Mr.  
19GES1161 JAYATHILAKA H.I.L. Mr.  
19GES1172 KUMARA L.I. Mr.  
19GES1177 MADHUSHAN L.G.T. Mr.  
19GES1212 THINES S. Mr.  
19GES1215 UDAWELA D.S.S. Mr.  
19GES1225 WIJEWARDHANA B.Y.L. Mr.  
19GES1233 GUNATHILAKE M.H.G. Ms.  
19GES1253 RATHNAYAKE R.M.A.G. Ms.  
19GES1265 WEERASEKARA M.K. Ms.

**GROUP 03**

19GES1128 AMILESH N. Mr.  
19GES1138 DILESHA G.A.K. Mr.  
19GES1155 JASOTHARAN S. Mr.  
19GES1169 KUDALIGAMA K.G.T.R. Mr.  
19GES1171 KUMARA A.H.D.A. Mr.  
19GES1174 LAKSHAN H.V.V.N. Mr.  
19GES1181 METHMAL I.A.J. Mr.  
19GES1186 PERERA G.K.J. Mr.  
19GES1231 DINESHIKA H.W.A. Ms.  
19GES1243 DASSANAYAKE M. M. S. Ms.  
19GES1246 NISANSALA R.C. Ms.

**GROUP 04**

19GES1133 BANDUSENA R.M.P.M. Mr.  
19GES1163 JEYATHARAN S. Mr.  
19GES1167 KARUNATHILAKA P.M.L.P. Mr.  
19GES1168 KAVISHKA W.G.Y. Mr.  
19GES1179 MADHUWANTHA H.A.N.A. Mr.  
19GES1196 RUSIRU P.A.C. Mr.  
19GES1205 SHAVINDA T.G.T.D. Mr.  
19GES1209 SUJEEVAN T. Mr.  
19GES1240 KAUSHALYA M.G. Ms.  
19GES1258 SHARIKA L.E.D.D. Ms.  
19GES1260 SWEDHA C. Ms.

**GROUP 05**

19GES1125 AHAMED A.R.R. Mr.  
19GES1141 DISSANAYAKA D.I. Mr.  
19GES1157 JAYASEKARA J.M.D.S.C.K. Mr.  
19GES1185 NIJINTHAN J. Mr.  
19GES1200 SAMARAWEEERA S.J.P. Mr.  
19GES1208 SUBASINGHE W.A.D.D. Mr.  
19GES1217 WAGARACHCHI C.R. Mr.  
19GES1221 WEERASINGHE H.A.K.P. Mr.  
19GES1236 JAYASENA W.A.S.S. Ms.  
19GES1244 MALLIKARATNE A.S. Ms.  
19GES1267 WICKRAMASINGHE M.C.S. Ms.

**GROUP 06**

19GES1126 AJANTHAN T. Mr.  
19GES1150 HERATH S.H.M.B.M. Mr.  
19GES1151 HETTIARACHCHI H.R.K. Mr.  
19GES1152 HINDAGODA H.M.S.L.B. Mr.  
19GES1160 JAYASINGHE K.A.T.S. Mr.  
19GES1187 PIRANAVAN R. Mr.  
19GES1219 WARNAKULASOORIYA W.K.D.D. Mr.  
19GES1247 PARAMANANTHAM D. Ms.  
19GES1254 SAMARASINGHA S.A.H.J. Ms.  
19GES1263 VINOTHIKA K. Ms.  
19GES1269 UDITH W.I. Mr.



SABARAGAMUWA UNIVERSITY OF SRI LANKA

ACADEMIC YEAR 2019/2020, YEAR II - SEMESTER II

FACULTY OF GEOMATICS

DEPARTMENT OF SURVEYING AND GEODESY

**GROUPS FOR FIELD PRACTICAL PROGRAMME**

**GROUP 07**

19GES1129 ANUSKANTH G. Mr.  
19GES1148 HERATH H.M.L.M. Mr.  
19GES1156 JAYARATHNA H.S.A. Mr.  
19GES1164 KAHAWALA P.P.M. Mr.  
19GES1182 MIHISARA S.V.G. Mr.  
19GES1188 PIRASANTH M. Mr.  
19GES1223 WIJESINGHA R.T.D. Mr.  
19GES1226 YASARATHNA H.P.D. Mr.  
19GES1227 YOOFITH J.M. Mr.  
19GES1251 PREMARATHNA E.G.W.D. Ms.  
19GES1271 THURSIKA V. Ms.

**GROUP 08**

19GES1149 HERATH H.M.S.P. Mr.  
19GES1162 JAYAWANSHA H.P.D.V. Mr.  
19GES1173 KUMARASIRI A.A.P. Mr.  
19GES1183 MUNASINGHE C.V. Mr.  
19GES1189 PIRATHAP S. Mr.  
19GES1213 THINESHKANTH V. Mr.  
19GES1214 THUVALIJAN P. Mr.  
19GES1216 VITHANA P. Mr.  
19GES1256 SARANGA R.M.D. Ms.  
19GES1257 SATHSARI N.W.A.U. Ms.  
19GES1268 LIYANAGE L.C.D. Mr.

**GROUP 09**

19GES1122 ABEYSINGHE L.D.K.S. Mr.  
19GES1137 DILAKSHAN T.J. Mr.  
19GES1165 KARUNANAYEKE K.A.Y.C. Mr.  
19GES1176 LUCKSHAN M. Mr.  
19GES1191 RAGULAN M. Mr.  
19GES1199 SAMARAKKODY S.T.R.S.P. Mr.  
19GES1202 SARATHCHANDRA H.S.R.S. Mr.  
19GES1222 WEERASINGHE W.M.L.S. Mr.  
19GES1235 JANENDRI M.M.D. Ms.  
19GES1245 NAVODYA M.V.I.K. Ms.  
19GES1249 PIUMANGANI D.H. Ms.

**GROUP 10**

19GES1132 BANDARA R.M.A.K. Mr.  
19GES1136 DANUJAN K. Mr.  
19GES1139 DILSHAN I.D.S. Mr.  
19GES1166 KARUNARATHNA N.G.K.S. Mr.  
19GES1195 RATHNAYAKE R.R.R.A. Mr.  
19GES1201 SANKALPA K.D.A. Mr.  
19GES1206 SHIVARUSHANTHARAJA S. Mr.  
19GES1210 THENNAKON L.H.R. Mr.  
19GES1234 J.Y. DURANGA Ms.  
19GES1238 JAYAWICKRAMA K.A.J.U. Ms.  
19GES1252 RASHMINI V.P.T. Ms.

**GROUP 11**

19GES1124 ABISHANTH M. Mr.  
19GES1135 CROOS A.S. Mr.  
19GES1144 DULANGA L.C. Mr.  
19GES1178 MADHUSHAN S. Mr.  
19GES1198 SAMANTHASIRI G.P. Mr.  
19GES1204 SHAMIL M.R.M. Mr.  
19GES1211 THILAKARATHNA A.P.S.L. Mr.  
19GES1230 DANUSHA R. Ms.  
19GES1232 GUNARATHNA A.O.A. Ms.  
19GES1239 KANCHANA L.K.T. Ms.  
19GES1242 MADHAVI G.A.K. Ms.

**GROUP 12**

19GES1131 ASHFAQ M.A.M. Mr.  
19GES1143 DISSANAYAKA D.M.S.S. Mr.  
19GES1153 HIRUSHA R.D.V. Mr.  
19GES1192 RAJAPAKSHA H.M.A.V. Mr.  
19GES1193 RATHNAYAKA K.R.M.L.M. Mr.  
19GES1197 SAARUJAN S. Mr.  
19GES1203 SENARATHNA M.R.R.K.P. Mr.  
19GES1250 PRAMODI S.D.T. Ms.  
19GES1255 SAMUDITHA G.L.T. Ms.  
19GES1259 SIRIWARDANA P.K.W. Ms.  
19GES1264 WALPITA Y.D. Ms.



SABARAGAMUWA UNIVERSITY OF SRI LANKA

ACADEMIC YEAR 2019/2020, YEAR II - SEMESTER II

FACULTY OF GEOMATICS

DEPARTMENT OF SURVEYING AND GEODESY

**RESPECTIVE INSTRUCTORS AND SUPERVISORS FOR FIELD PRACTICAL  
PROGRAMME**

Group No.	Field Instructor	Field Supervisor
1	Mr. K.D.N. Jayanatha	Mr. A.N.D.Perera
2	Mr. M.S.K.B.Maldeniya	Dr. H. Divithure
3	Mr. A.H. Rupasinghe	Prof. H.R.S. Bandara
4	Mr. K.A.S.Thilakarathne	Mrs. D.S.Munasinghe
5	Mr.D.R.Manathunga	Dr. H.M.I.Prasanna
6	Mr.D.R.Manathunga	Mr. T.D.A.Gomesz
7	Mr. P.R.C.N. Kumara	Dr. N.M.P.M. Piyasena
8	Mr. P.R.C.N. Kumara	Dr. M.D.E.K. Gunathilaka
9	Mr. U.A.P.Hapugoda	Dr. D.R.Welikanna
10	Ms. L.K.K.Yapa	Mr.K.K.D.W.S.Kannangara
11	Ms. E.A.D.U. Edirisinghe	Mr.K.K.D.W.S.Kannangara
12	Mr.J. Rajavarathan	Prof. H.R.S. Bandara

**Mr. K.K.D.W.S.Kannangara**

*Lecturer (Land Surveying Field Practical)*

26.10.2023



## **LDSP 15 – Engineering Surveying (Year II Semester II)**

*“An Engineering Survey is defined as a survey executed for the purpose of obtaining information that is essential for planning an engineering project for development and estimating its cost. The information obtained may, in part, be recorded in the form of an engineering map.”*

*Knowledge of the nature of ground surface is required to locate suitable alignments and to estimate the volume of earthwork for all engineering projects including roads, railways, housing etc. These kinds of plans are commonly prepared when layouts of large projects are under construction. Accurate contour plans are invariably prepared when reservoir projects are being designed. Generally, a small vertical interval is required for Large Scale Plans and for surveys on fairly even sites while in hilly and small scales, a wider vertical interval is used.*

*The main value of a contour plan is that it enables an assessment to be made of the topography. Contour lines are shown on plans often in distinctive colour to clearly interpret the topography or relief of an area.*

### **Objective**

To study the methodology of preparing a close interval contour plan of a small block using Grid Levelling method.

### **Equipment**

Theodolite with Tripod	01	Gig Umbrella	01
Metric Steel Tape	01	Surveying Poles	03
Plummets	02	Linen Tape	01
Level with Tripod	01	Metric Staves	02
Catties	02	Crowbar	01
Hammer	01		
Total Station with Tripod	01 (For control traversing)		
Target with Prism	02 (For control traversing)		

### **Field Work**

- Each block comprises of 50m x 50m extent.
- You'll be given block diagrams, which indicate the following information.
  - ❑ The corner coordinates of each block to locate the area approximately,
  - ❑ Schedule of grid clearing,
  - ❑ Traverse line existing on field which is required to re-open the horizontal control points,
  - ❑ Benchmarks (vertical control points) in the vicinity,
  - ❑ Proposed traverse and level line diagrams for each group.



- TBMs-Type G (Temporary benchmarks-set out wooden pegs tapered at the top) should be buried & established at all the grid corners while you're clearing the grid lines.
- Traverse lines should be run via grid corners to assign them horizontal control. (N. E-coordinates).
- Level lines should be run via grid corners to assign them vertical control. (Z-elevations).
- Direction of lines along which, spot heights are to be taken should be chosen towards either *North-South* or *East-West* according to the slope of the terrain.
- Lines along which, spot heights are to be taken should be set out at 10m spacing with TBMs-Type G.
- Spot heights should be taken at 10m intervals along the lines with slatted wooden pegs.

*Note: additional spot heights required for "Height Interpolation" should be taken at banks, bed of water features, road cuttings, top of rocks and bunds, rock out crops, along streams, roads and channels etc. and at the places where the terrain undulations are considerable according to the contour interval.*

- Spot heights should be taken up to 10m range out of the blocks that are not covered by adjoining ones.
- All BMs, TBMs and details (Man-made and natural features) such as boundaries of cultivation, streams, roads, paths, channels, rocks, bunds, public buildings etc. should be surveyed.
- Progress diagrams for clearing, surveying and levelling should be maintained.



### *Establishing Control Network*

*Schedule of establishing horizontal control network.*

<i>Group No</i>	<i>Traverse No (TT #)</i>	<i>From</i>	<i>To</i>	<i>Remarks</i>
1	TT1	SUSL-05	SUSL-P	To establish controls for South boundary
2	TT1	SUSL-P	SUSL-05	To establish controls for South boundary
3	TT2	SUSL-P	SUSL-Q	To establish controls for South & East boundary
4	TT2	SUSL-Q	SUSL-P	To establish controls for South & East boundary
5	TT3	SUSL-Q	SUSL-R	To establish controls for East & North boundary
6	TT3	SUSL-R	SUSL-Q	To establish controls for East & North boundary
7	TT4	SUSL-Q	NSG-02	To establish controls for North boundary
8	TT4	NSG-02	SUSL-Q	To establish controls for North boundary

*Schedule of establishing vertical control network.  
Levelling program – 1 (for network adjustment)*

<i>Group No</i>	<i>Level Line No (L#)</i>	<i>From</i>	<i>TO</i>	<i>Remarks</i>
9	L1	SUSL-05	SUSL-P (TT1 route)	<i>Each group should run Fly Backs for each Level line. (Reverse Level Lines) and perform the adjustment computation to get the BM values.</i>
10	L2	SUSL-P	SUSL-Q (TT2 route)	
11	L3	SUSL-Q	SUSL-R (TT3 route)	
12	L4	SUSL-R	NSG-02 (TT3 route)	



*Schedule of establishing Grid Corners & grid clearing program proceeded with traversing.*

<b>Group No</b>	<b>Traverse No(DT #)</b>	<b>Horizontal (x,y) points to be established and touched</b>	<b>Remarks</b>
1	DT 1	B1, C1	
2	DT 2	B2, C2	
3	DT 3	A3, B3	
4	DT 4	A4, B4	
5	DT 5	A5, B5	
6	DT 6	A6, B6 -jointly with Group-9)	
7	DT 7	A7, B7-jointly with Group-8)	
8	DT 8	C7, B7-jointly with Group-7)	
9	DT 9	C6, B6 -jointly with Group-6)	
7	DT 10	D1, D2	
8	DT 11	D3, C3	
9	DT 12	C4, C5	

*Note: All points should be established by each relevant group.*



*Schedule of Detail Levelling program – 2*

Group No	Level Line No (DL#)	Through	Remarks
1	DL 1	B1, C1	
2	DL 2	B2, C2	
3	DL 3	A3, B3	
4	DL 4	A4, B4	
5	DL 5	A5, B5	
6	DL 6	A6, B6 -jointly with Group-9)	
7	DL 7	A7, B7-jointly with Group-8)	
8	DL 8	C7, B7-jointly with Group-7)	
9	DL 9	C6, B6 -jointly with Group-6)	
10	DL 10	D1, D2	
11	DL 11	D3, C3	
12	DL 12	C4, C5	

*Coordinates for Control Traversing (T1&T2);*

Point No.	Northing	Easting	Remarks
NSG 01	467,958.372	501,891.446	GPS
NSG 02	467,937.915	501,869.794	GPS
NSG 05A	467,872.113	501,830.639	GPS
SUSL- R	~ 467680	~ 502130	Proposed Traverse point
SUSL- Q	~ 467600	~ 502300	Proposed Traverse point
SUSL- P	~ 467550	~ 502150	Proposed Traverse point
SUSL 04	467,651.487	501,785.660	GPS
SUSL 05	467,609.740	501,830.706	GPS
SUSL 06	467,684.210	501,870.405	GPS

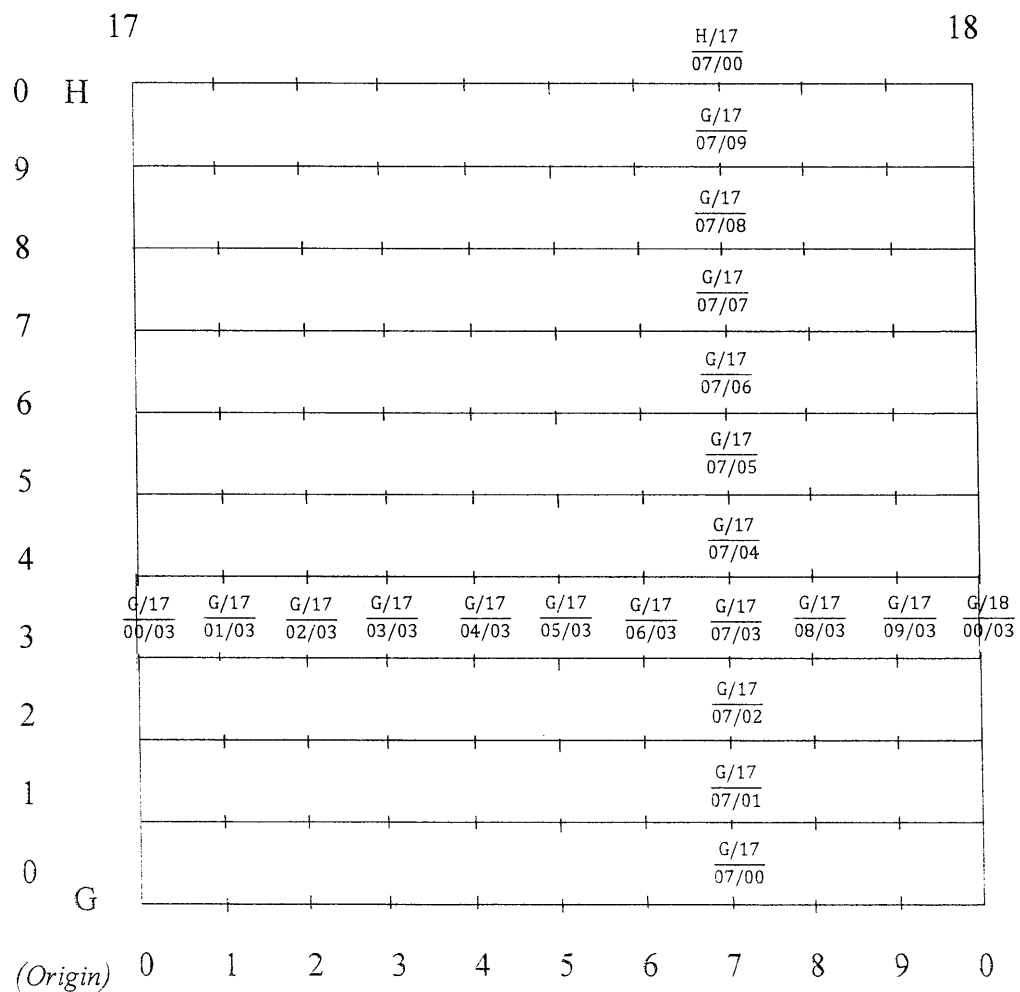




Heights of Bench Marks in the vicinity:

BM No	Height (m)	Remarks
NSG-02	592.286	Known
SUSL-05	574.429	Known
SUSL-07	573.053	Known

## Grid Numbering System





## Plan Work

### General

- Flat plan should be drawn on A3 size sheet (Base Sheet).
- 5cm x 5cm grids should be drawn according to the annexure 1.
- Overall error of the grids should not exceed 1mm.
- All grid lines should be inked in *Persian Blue*  
(Line size-0.3mm)

Ink all pickets and chain lines in *Persian Blue* with correct symbols and sizes.

E.g: □ , ○ , △ ,etc.

- Tracing paper should also be gridded in same way but only the marginal grids in *Persian Blue* and rest in pencil.

### Base Sheet

- All the details, annotations plotted in the corpus of the plan should be in pencil with correct sizes given for engineering surveys.
- Edge comparison tracing sheets should be prepared to compare with adjacent sheets.
- Layout of *Index Map (Scale-1:5000)* should be drawn appropriately and sheet Nos. should be printed at center of each sheet. The relevant block should be hatched.
- Any old work dealt should be compared with original work (Private of Lease Lands being surveyed during field survey has to be incorporated either by fixation or re-plotting).
- The title “***Mahatenna Engineering Surveys – 2022 September***” should be printed at center of top margin.
- Grid coordinates should be printed along but perpendicular to lowest and the most left grid lines towards the direction to where the value increases.

**Note:** *N and E coordinates at SW corner, N coordinate at NW corner and E coordinate at SE corner of the sheet in blue ink.*

- “**Plan No:**” should be printed at top LHS corner of sheet according to the following format.

*Year No/Student's No/Group No/Plan No*

**Eg: 17/0933/G01/01**



- FB references should be printed appropriately within the corpus of the plan in blue ink.
- All boundary descriptions, different cultivations, stream names, roads, tenements etc. should be printed in their correct sizes in pencil with abbreviated form or fully in Base sheet.
- “**District**” and “**Province**” should be printed in pencil on RH side of the sheet.
- Field book and Level book references should also be printed in pencil on RH side appropriately.
- “**Reference** or **Legend**” that explains the abbreviations used should be printed in pencil on RH side.
- All marginal descriptions such as period of survey, surveyed by, drawn by, checked by etc. should be printed in pencil.
- Having completed all above plan work get your plan checked for necessary amendments initialed by your Instructor.

#### **Height Interpolation**

- All the spot heights taken sequentially should be plotted in pencil with  $45^{\circ}$  inclinations along the grid lines and other auxiliary lines parallel to grids and spot heights taken randomly should be plotted at relevant positions with same inclination on Base sheet.
- Interpolation should be preceded on base sheet.

*Note: 5m contours should be interpolated first as accurately as possible and get the tracing checked by your instructor, 1m contours should be interpolated subsequently in pencil.*

- All contours should be shaped in pencil until curves seem to be smooth, without dropping the accuracy.
- Continuation of contours and details should be compared and ascertained with the adjacent sheets.



### Contour Sheet

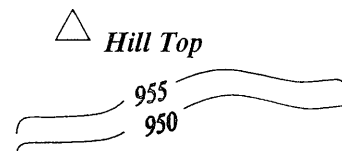
- “**Diagram No:**” should be printed at top LHS corner of sheet according to the following format.  
*Year No/Student's No/Group No/Plan No (Eg: 17/0933/G01/01)*
- Contour plan should be prepared on tracing paper.  
*(Scale-1:250, contour interval -1 m)*
- All details appearing on the base sheet should be traced on to the tracing sheet in *Black ink* in appropriate positions with correct sizes. TBM (*Type-G*), established at grid corners should be shown on contour sheet in Black ink horizontally with correct symbol, size (1.5mm x 1.5mm square) & height value.



923.784

- Contours should be inked according to the following format:  
Continuation of contours should be broken at details,  
Thickness of Index contour (*5m*) should be 0.8mm  
Thickness of 1m contours should be 0.3mm
- Additional height should be inked randomly according to the importance of requirements of engineering design and to avoid any ambiguity in interpolation of contours.
- 5m contour values should be printed as follows,

*Eg:*



- Grid coordinates should be printed as mentioned earlier, but in Black Ink.
- *Contour interval* should be printed at RH corner below the scale.
- *Datum* used for all levels should be printed above the bottom margin.
- *Outer margins of the sheet should be inked.*

### List of TBMs

Relevant groups should prepare list of TBM heights for each block with following details.

1. Number & description
2. Northing & Easting (up to 3 decimals)
3. Adjusted height (up to 3 decimals)
4. FB & LB references



**Documents to  
be submitted**

Group Submission

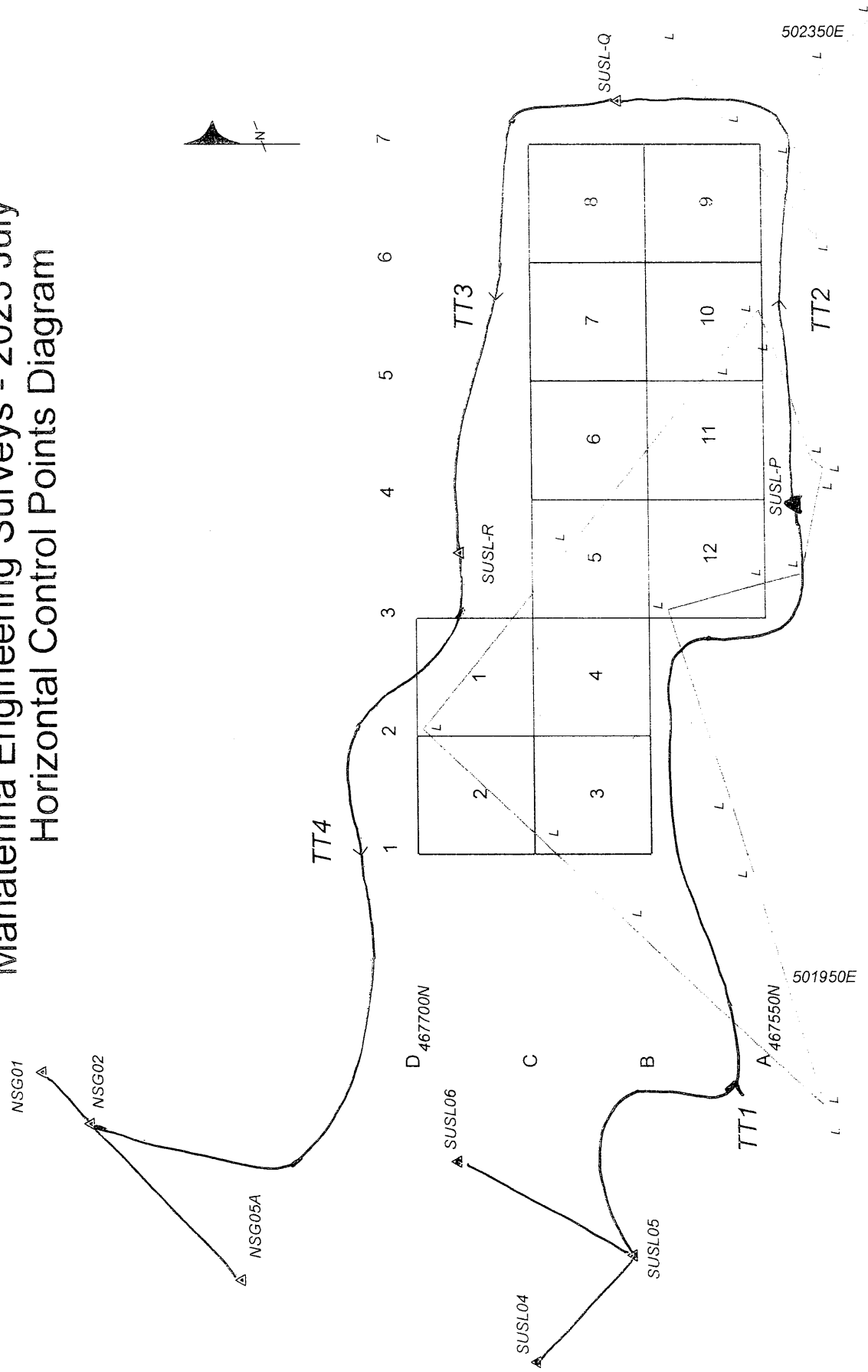
- ☞ Working Progress Diagram
- ☞ Prospection Diagram
- ☞ Clearing Progress Diagram
- ☞ Traversing Progress Diagram
- ☞ Dead measurement sheets
- ☞ Traverse angle observation sheets (if applicable)
- ☞ Traverse coordinate sheets
- ☞ Level Progress Diagram
- ☞ Complete Field Books & Level Books

Individual Submission

- ☞ Base Plan
- ☞ Contour tracing plan
- ☞ Comparison Sheet
- ☞ Completed Field books and Level books
- ☞ List of *TBM*s
- ☞ Reports

**Submission:** Date of submission will be given by the Supervisor.

# Mahatenna Engineering Surveys - 2023 July Horizontal Control Points Diagram



Department of Surveying & Geodesy - Faculty of Geomatics  
Sabaragamuwa University of Sri Lanka  
LDSP 16 - Setting Out Survey



*"Surveying is recording ground details and producing a plan. Setting out is the opposite of surveying. In setting out we transfer information from a plan to the ground using the surveying instruments. This task is commonly performed by site engineers supervising new construction works. There are 3 distinct elements in setting out: Horizontal Control (Correct Place), Vertical Control (Correct Level) and Vertical Alignment (to ensure that multi-stories or underground construction is plumb)."*

(ENPD2150 – The University of Western Australia)

**Objective**

To set out a center line of a road for a gradient according to the contour plan drawn.

**Equipment**

Theodolite with Tripod	01	Metric Steel Tape	01
Plummets	02	Surveying Poles	03
Gig umbrella	01	Catties	01
Level with Tripod	01	Metric Staves	02

**Field Work**

- ☞ Mark the center line on the ES plan according to the given gradient. (15% in general)
- ☞ Compile the coordinates at the starting, end and every intersection point.
- ☞ Set out and survey the center line on the ground.
- ☞ Check the accuracy.
- ☞ Take the longitudinal and cross sections at suitable interval.  
(Eg. LS – 10m, CS – 7m)

**Documents  
to be  
Submitted**

Tracing diagram on suitable scale (A3 size), which shows the Longitudinal and Cross Sections of the terrain, completed Field books, Level books and individual Reports duly signed by the student should be submitted to the office.

**Submission:** Individual submission dates will be assigned by the supervisor.

References: [https://en.wikipedia.org/wiki/Grade\\_\(slope\)](https://en.wikipedia.org/wiki/Grade_(slope))

