I. EXCAVATION

$$V = (L + FA * 2) \times (W + FA * 2) \times (D + GB) \times no.\ of\ sets$$

Ex.

NOTE: 1m = 100 cm = 1000 mm

F-1 (Qty: 6)

Isolated footing (same concept and principle with combined footing, only different in dimensions):

L: 1000 mm

W: 1000mm

T: 300mm

D: 1200 mm

Gravel bedding (GB): 100mm (DEFAULT VALUE IN EARTHWORKS PARAMETERS)

Formwork Allowance (FA): 250mm (DEFAULT VALUE IN EARTHWORKS PARAMETERS)

Volume of soil to be excavated

$$V = [(1000 + 250 * 2) \times (1000 + 250 * 2) \times (1200 + 100)] \times 6 = 1.755 \times 10^{10}\ mm^3\ or\ 17.55\ m^3$$

F-2 (Qty: 5)

Isolated footing:

L: 900 mm

W: 900 mm

T: 300 mm

D: 1200 mm

Gravel bedding (GB): 100mm

Formwork Allowance (FA): 250mm

Volume of soil to be excavated

$$V = [(900 + 250 * 2) \times (900 + 250 * 2) \times (1200 + 100)] \times 5 = 1.274 \times 10^{10}\, mm^3\ or\ 12.74\, m^3$$

F-3 (Qty: 2)

Isolated footing:

L: 800 mm

W: 800 mm

T: 300 mm

D: 1200 mm

Gravel bedding (GB): 100mm

Formwork Allowance (FA): 250mm

Volume of soil to be excavated

$$V = [(800 + 250 * 2) \times (800 + 250 * 2) \times (1200 + 100)] \times 2 = 4.394 \times 10^{9}\, mm^3\ or\ 4.39\, m^3$$

Total volume to be Excavated for column footings:

=17.55 + 12.74 + 4.39 = **34.68m^3**

Excavation For WALL FOOTING and TIE BEAM:

WF -1 (Qty: 1) (USUALLY , QTY IS ALWAYS 1)

L F-F = 32700mm or 32.7 m

B = 400mm (BT if trapezoidal)

D = 600 mm

Gravel bedding (GB): 100 mm

Formwork Allowance (FA): 100 mm

$V = \left[(L_{_{F-F}} + FA * 2) \times (W + FA * 2) \times (D + GB)\right] x\, 1$

$$V = [(32700 + 100 * 2) \times (400 + 100 * 2) \times (600 + 100)]\, x\, 1 = 1.3818\, x10^{10}\, mm^3\, or\, 13.818\, m3$$

II. GRADING AND COMPACTION

$$A = (L + FA * 2) \times (W + FA * 2) \times no.\ of\ sets$$

F-1 (Qty: 6)

Isolated footing:

L: 1000 mm

W: 1000mm

Formwork Allowance (FA): 250mm

$$A = [(1000 + 250 * 2) \times (1000 + 250 * 2)] \times 6 = 13.5\, m^2$$

F-2 (Qty: 5)

Isolated footing:

L: 900 mm

W: 900mm

Formwork Allowance (FA): 250mm

$$A = [(900 + 250 * 2) \times (900 + 250 * 2)] \times 6 = 9.8\, m^2$$

F-3 (Qty: 2)

Isolated footing:

L: 800 mm

W: 800mm

Formwork Allowance (FA): 250mm

$$A = [(800 + 250 * 2) \times (800 + 250 * 2)] \times 2 = 3.38\, m^2$$

WF-1

$L_{F\text{-}F}$ = 32700mm or 32.7 m

W = 400mm

Formwork Allowance (FA): 100 mm

$$V = \left[(L_{F-F} + FA * 2) \times (W + FA * 2) \times set\right]$$

$$A = [(32700 + 100 * 2) \times (400 + 100 * 2)] \times 1 = 19.74\, m^2$$

SLAB ON GRADE

A=80 m2

Total Area for Compaction = 13.5 + 9.8 + 3.38 + 19.74 + 80 = **126.42 m2**

III. Gravel Bedding

$$V = (L + FA * 2) \times (W + FA * 2) \times (GB + (GB * \%)) \times no.\ of\ sets$$

IN PARAMETERS, USER SELECTED G-1; GRAVEL G-1 = P530.00

F-1 (Qty: 6)

Isolated footing:

L: 1000 mm

W: 1000mm

Gravel bedding (GB): 100mm

Compaction Allowance (%) = 30% or 0.3 of GB (DEFAULT IS ALWAYS 30%)

Volume of gravel bedding for F-1

$$V = [(1000 + 250 * 2) \times (1000 + 250 * 2) \times (100 + (100 * 30\%))] \times 6 = 1.755\, m^3$$

F-2 (Qty: 5)

Isolated footing:

L: 900 mm

W: 900 mm

Gravel bedding (GB): 100mm

Compaction Allowance (%) = 30% or 0.3 of GB

Volume of gravel bedding for F-2

$$V = [(900 + 250 * 2) \times (900 + 250 * 2) \times (100 + (100 * 30\%)] \times 5 = 1.274\, m^3$$

F-3 (Qty: 2)

Isolated footing:

L: 800 mm

W: 800 mm

Gravel bedding (GB): 100mm

Compaction Allowance (%) = 30% or 0.3 of GB

Volume of gravel bedding for F-3

$$V = [(800 + 250 * 2) \times (800 + 250 * 2) \times (100 + (100 * 30\%)] \times 2 = 0.439\, m^3$$

WF – 1

L: 53.25 m

W: 400mm or 0.4m

Gravel bedding (GB): 100mm

Compaction Allowance (%) = 30% or 0.3

Volume of gravel bedding for WF-1

$$V = [(53250 + 100 * 2) \times (400 + 100 * 2) \times (100 + (100 * 30\%))]\, x\, 1 = 4.1691\, m^3$$

SLAB ON GRADE

A: 80m2

Gravel bedding (GB): 100mm

Compaction Allowance (%) = 30% or 0.3 of GB

V= 80 x 0.13 = 10.4 m3

Note: 0.05 is factor of safety default

Total Volume for Gravel Bedding = 1.755 + 1.274 +0.4394 +4.1691 +10.4 = 18.0375 x 0.05 = 0.901; 18.0375 + 9.01 = 18.93 or **19 m3**

IV. SOIL POISONING

SOIL POISONING IS P 60.00/ m2

$$Area\ of\ Slab = soil\ poisoning$$

Area of slab = 80 m2 = Area of soil poisoning = 80 m2

V. Backfilling and compaction

1. Slab Thickness + Gravel bedding thickness
   = 100 mm + 100mm = 200mm

2. Subtract each inputted Elevation of flooring to the sum of ST and GT
   *POSITIVE = FILL; *NEGATIVE = CUT
   Elev 1: 150mm – 200mm = -50mm (CUT)

Area: 11.625
Elev 2: 225mm - 200 mm = 25mm (FILL)
Area: 4.875
Elev 3: 250mm – 200mm = 50 mm (Fill)
Area: 63.77

3. Concreting – Volume taken up by concrete members and gravel bedding after excavation

   V= L x W x t

   F-1:
   = 1m x 1m x 0.3 m x 6sets = 1.8 m3
   F-2:
   = 0.9 m x 0.9m x 0.3 x 5 sets = 1.215 m3
   F-3:
   = 0.8m x 0.8m x 0.3 x 2sets = 0.384 m3

   WF-1
   = 53.25m x 0.4 x 0.2 = 4.26 m3
   * If there's a tie beam, follow the same computation for WF-1 (wall footing).

   Total Volume taken by concrete:
   = 1.8+1.215+0.384+4.26 = 7.659 m3

   Volume taken up by Gravel bedding (Only Footing and Wall footing, Beam footing)
   = 1.755 + 1.274 +0.439 + 4.1691 = 7.6371

   Add them together = 7.659 + 7.6215= **15.2961 m3**

4. Volume for Cut and Fill

Total Volume needed to Cut= (Area 1 of Cut x Thickness) + (Area 2 of Cut x Thickness) + ….

   = 11.625 m2 x 0.05 = **0.58125 m3**

   Total Volume needed to Fill = (Area 1 of Fill x Thickness) + (Area 2 of Fill x Thickness) + ….
   = 4.875*0.025 + 63.77 *0.05 = **3.3104m3**

5. Compute for Excess soil = Concreting + Gravel bedding + Total Cut

   = 15.2961 m3 + 0.58125 m3 = 15.87735 m3 *total excess soil*

6. Find out If there is a need to buy more soil for filling (panambak) or excess soil is enough
   1st condition: If Excess soil > Total need for Filling; No need to Buy soil
   2nd condition: If Excess soil < Total need for filling; Need to buy Soil

   15.87735 m3 > 3.3104m3; therefore, no need to buy soil (first condition)

   ***If for example there is a need to buy soil (2nd condition):**

   10 m3 < 15m3; There is a need to buy Soil
   = Soil needed for filling – Total excess soil
   = 15 m3 – 10m3 = **5m3 more soil is needed. Add to total cost of soil (per m3)**

Total:

Excavation=

$$\sum Footing\ Excavation + \sum Cut + \sum Wall\ Footing\ Excav = 34.68 + 0.58125 +$$

Backfilling and compaction =

$$\sum Footing\ Excav + \sum Wall\ Footing\ Excav + \sum Fill - \sum Excess\ soil$$

= 34.68 + 13.818 + 3.3104 – 15.8773 = **35.93 m3**

Grading and compaction = 126.42 m2

Gravel Bedding = 19 m3

Soil poisoning = 80 m2

PRICING:

ITEM	DESCRIPTION	QTY	UNIT	Materials		Labor		TOTAL COST
				UNIT COST	TOTAL	UNIT COST	TOTAL	
1.0	EARTHWORKS							
1.1	Excavation	49.08	cu.m.		-	400.00	19632.00	19632.00
1.2	Backfilling and Compaction	35.93	cu.m.		-	400.00	14372.00	14372.00
1.3	Grading & Compaction	126.42	sq.m		-	350.00	44,240.00	44,240.00
1.4	Garvel bedding Compaction	19	cu.m.	530.00	10,070.00	300.00	5700.00	[illegible]
1.5	Soil Poisoning	80	sq.m	60.00	4,800.00		-	4,800.00
	TOTAL				14361.20		83656.00	₱ 98814.00

Total cost = Total Material cost + total Labor Cost

material cost = Unit cost for material x QTY

Labor cost = Unit cost for labor x QTY

Note: All unit cost has a corresponding price value whether default or inputted by user.