Excavation – Commercial Guidelines

a. At start of project, contour survey of entire site to be carried out. A copy of this contour survey with spot levels in 2.5 m c/c grid (max. 5 m c/c for large areas) is to be maintained by Const mgmt and Cost mgmt as reference for all costs associated with excavation.
b. For any building, the 'pay line' for excavation has to be fixed in a following manner:
    a. In case of soil, considering slope of 25% (1:4) from the (external face of the footing + 30 cm for every 3 mtr depth of excavation).
    b. In case of hard rock, slope of 0 (vertical) from the (external face of the footing + 30 cm for every 3 mtr depth of excavation). In case where the base level of the excavation is predetermined and firm, the base level will be treated as the pay line for the depth of excavation.
    c. Initial ground levels shall be taken at the grid points not more than 2.5 mtrs c/c distance for all building and road excavations. In case of large area excavations this may be increased to 5.00 mtrs c/c provided that the terrain is not uneven. If the grid points occur at localized protrusions or depressions, these will be shifted to give general ground level within that grid .
    d. It should be ensured that payment for the sloping portion is done taking average of top and bottom dimensions (top dimensions will always be higher than actuals).Wherever possible the quantities be calculated using Simpson's formula (see **Annexure A** below).
    e. Any excavation done beyond the pay line should not be paid for.
    f. Prior to start of work, 'Pay Line' map should be given to the contractor and sign off is to be taken by the concerned person from Const Mgmt. A signed copy is to be sent along with the first excavation bill for that building/structure/area in case of roadworks. A sample 'pay line' is annexed hereto as **Annexure B**. Pay line drawings have to be prepared in both the directions for all locations having different base levels or plan dimensions.
c. On completion of excavation and prior to start of any further work, photographs of final excavated strata level are to be taken for each building, with ground level also visible in the said photograph (resp: Const Mgmt).
d. Definitions:
    a. Soil – any material, including soft rock which does not qualify under definition of 'rock' below and is generally removable using bucket.
    b. Rock - RQD > 70 and requires rock breaker, pneumatic equipment or splitters or blasting for removal; cannot be removed using bucket; this rock can be used under roller for soling in road works and will not disintegrate.
e. Rate should be taken for following items:
    a. Soil excavation with backfilling for same /adjacent building
    b. Soil excavation with shifting within site (maximum lead of 100 m)
    c. Soil excavation with dumping outside site
    d. Rock excavation with dumping at a given location in same site (maximum lead of 100 m)
    e. Rock excavation with dumping outside site
f. Disposal of material:

a. Soil – Disposal outside the site should be considered only if the Project Head – Construction Management is convinced that the same cannot be used within the site in the next 2-3 months or where storage is not possible within the site.
b. Rock – should be retained within the site and used for road works; necessary rock breaking is to be done by different agency in parallel to excavation to ensure that the hard rock can be put to use immediately. Disposal permitted only if no storage is possible at site in opinion of Project Head – Construction Management. If disposal outside site is being considered, Project Head – Construction Management should check whether this rock can be stored/used at a nearby Lodha site and if so, this route should be preferred.

g. All excavation bills are to be cross-certified by the QE (Quality Enhancement) team.
h. No excavation works should be done by using machinery on hourly basis – payment should be on excavated quantity measurement basis only.
i. Excavation costs should be a separate budgeted activity within Structure / Infra packages and costs need to be monitored closely by Cost mgmt.
j. The Controls team is to use the contour survey, soil investigation report, signed off 'pay line' and excavation bills to ensure that there is to slippage/wastage in excavations costs. They may also conduct vigilance of actual excavation levels at site from time to time.
k. It is to be ensured that <u>original, true</u> royalty receipts for atleast 70% of the excavated quantity is available at site. There should be NO relaxation wrt this issue. Primary responsibility of Const mgmt and to be cross-checked by Controls team.

Annexure A

$A = d/3 (Y0 + 4Y1 +2Y2 +.....+2Y(n-2)+4Y(N-1) +Y(N))$

WHERE : 1. A = Area of cross section.

2. d = distance between any two adjacent height coordinates . (in our case the gridline distance)

3. Y = Height coordinates (in our case difference in original and final level distance at each grid point along a given grid line along which C/s area is being computed.

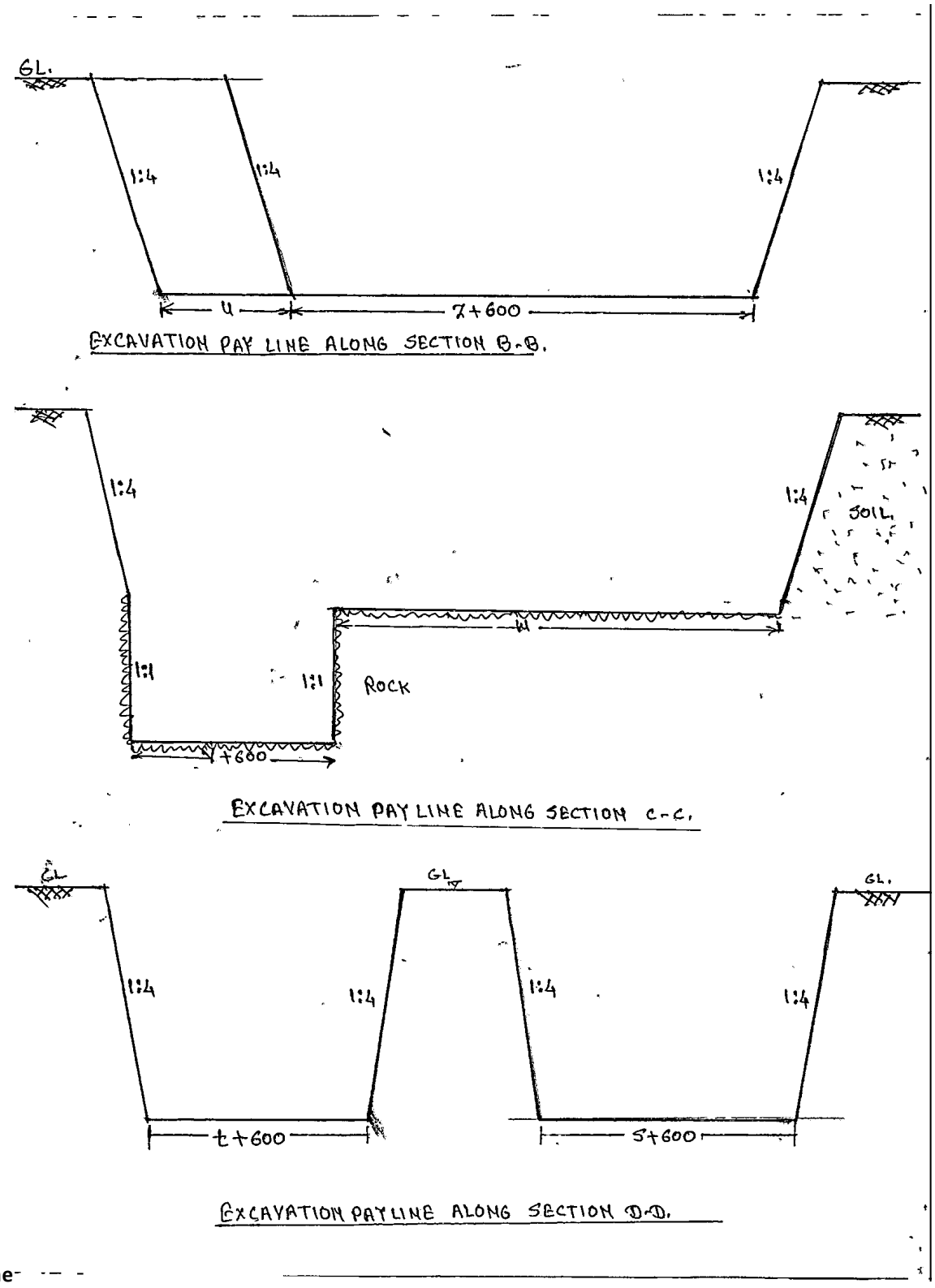
4. N = total number of grid point less 1. i. e. Total no of grid points are N +1.

Similarly

$V = s/3 (A0 + 4A1 +2A2+.....+2A(N-2)+4A(N-1) + A(N))$

WHERE : A (X) is the area of c/s along grid number x , and so on.

Annexure B : Sample Pay



Line- -— -