The volume (m3) and tonnages of materials used to construct the TMF (consented) including the detailed split by lift is presented with the 2011 ES, at Appendix 3, Appendix K, Bill of Quantities. The tailings tonnage is limited to 400,000t which, at a settled density of 1.35t/m3, is 296,296m3. The detail of tailings capacity was included at Table 6.1, at Appendix 3 of the 2011 ES.

The consented scheme also included other significant alteration to landform: an earthfill Recirculation Pond (RCP) Embankment, an earthfill Plant Bund and the diversion of the Allt Eas Anie (AEAD) with significant alteration to landform, being in cut.

The materials for the embankments (TMF and RCP) and the Plant Bund are sourced from the mine (barren rock), the AEAD and the TMF/RCP footprints. 6,900m3 of rock is from the AEAD, the remainder from the mine. Earthfill is generated from the AEAD and in part from the TMF footprint.

The total alteration to landform which was previously consented is as follows:

|  |  |  |
| --- | --- | --- |
|  | Tonnage | Volume (m3) |
|  | TMF |  |
| earthfill | not specified | 130,273 |
| rockfill | not specified | 33,403 |
| filters | not specified | 6,000 |
| tailings | 400,000 | 296,296 |
| subtotal |  | 465,972 |
|  | RCP |
| earthfill |  | 10,000 |
|  | Plant Bund |  |
|  |  | 27,670 |
|  | AEAD |  |
| earth |  | -38,100 |
| rock |  | -6,900 |
|  |  |  |
| Fill (alteration above existing landform) | 503,642 |
| Cut (alteration below existing landform) | -45,000 |

While operationally the total volume of material disturbed is 503,000m3, at restoration it is also relevant to consider the 90,000m3 earthfill which originated from the TMF footprint; the change vs existing topography would therefore have been 413,642m3.

The current proposal is for a Tailings Storage Facility comprising 10 separate stacks, each on a basal drainage layer of rock, with tailings placed over the top and earth/soil/vegetation replaced over this.

The plant bund is reduced, there is no RCP embankment or AEAD required.

The comparative figures are as follows:

|  |  |  |
| --- | --- | --- |
|  | Tonnage | Volume (m3) |
|  | TSF |  |
| earthfill | n/a | n/a |
| rockfill | 172,332 | 86,166 |
| filters | n/a | n/a |
| tailings | 552,779 | 345,487 |
| subtotal | 725,111 | 431,653 |
|  |  |  |
|  | Plant Bund |  |
|  |  | 19,602 |
|  |  |  |
| Fill (alteration above existing landform) | 451,255 |

The figures quoted at Appendix 3 of the 2017 ES, at Table 4-3 Design Criteria, were subsequently updated during the development of the proposal and the latest figures are presented at Appendix 3 – Appendix G, Construction Schedule, N.B. the tailings figure varies slightly between schedules 1 and 2 (decreasing to 344,536m3 on Schedule 2).

The operational disturbance now relates to 451,255m3, while at restoration this total alteration to landform is 9% larger by volume.

The above ground volumes are broadly similar for the two schemes (an increase of 9%) as one of the initial design considerations for the current scheme was the previously acceptable scale of alteration to landform.

It must however also be noted that while the total volume is of the same order of magnitude, and a slight increase, the current proposal for tailings placement is far superior in relation to the ultimate landform and its landscape fit.