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## The SAFER Borehole Database (SAFER/GEO-591)

### User Manual

by

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(version 1.0)

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## 1 INTRODUCTION

The SAFER Borehole Database (SAFER/GEO-591) has been developed as part of the Engineering and Physical Sciences Research Council (EPSRC) funded project EP/P028926/1: Seismic Safety and Resilience of Schools in Nepal (SAFER). The database is populated with data digitised from the literature, published reports and datasets supplied by contributors from the geotechnical engineering industry in Nepal and research papers.

The database file structure is based on the Association of Geotechnical and Geoenvironmental Engineering Specialists (AGS) data format (AGS, 2017). The database describes 529 borehole logs distributed throughout the Kathmandu Valley, Nepal including data at 591 different locations including ground conditions, groundwater levels, *in situ* tests and geotechnical laboratory testing. The boreholes were collected from sources either originally pursued for research purposes or conducted during commercial geotechnical investigations. This report outlines the database structure, methodology and details of the meta-data available in the database.

The Kathmandu Valley in Nepal is an earthquake prone region which has been subject to reoccurring high magnitude earthquakes, in recent years particularly the Gorkha 2015 event (e.g. Goda et al. 2015). The purpose of the database collection was to present a unified database of ground information and shear-wave velocity ( $V_s$ ) measurements to inform any future research undertaken in site response analysis.

The database has been uploaded to the data.bris Research Data Repository at the University of Bristol, and has been released online for use by the community under the CC-BY 4.0 Licence.

## 2 DATABASE BUILDING

### 2.1 Data sources

The SAFER database includes data from literature, industry and reports. All sources have been referenced in Appendix I. The data included in the database has been allocated a unique identifier (ID) which reflects its source type, the organisation name or authors of the data, the year the data was obtained and a borehole ID number (commonly reflecting the borehole numbers provided in the original source data). Some examples are provided in Table 1 below.

*Table 1 - Examples of unique identifiers*

| Type <sup>(1)</sup> | Organisation/<br>author/location | Year | BH No. | Unique Identifier |
|---------------------|----------------------------------|------|--------|-------------------|
| R                   | JICA                             | 1990 | B1     | R_JICA_1990_B1    |
| RES                 | Pagl                             | 2018 | BH1    | RES_Pagl_2018_BH1 |
| IND                 | Baba                             | 2008 | BH1    | IND_Baba_2008_BH1 |

<sup>(1)</sup> Type (where R = report; IND = industrial; RES = research such as journal/conference paper)

Those from consultancy sources (of type IND) were assigned a four-letter code which represents the first four letters of a location in the Kathmandu Valley instead of an organisation name to maintain anonymity e.g. Bhak would represent industry data available from Bhaktapur. Where the source is from a research article the first four letters of the first author is taken and a similar method is taken for organisation reports. Where year is unknown this has been specified as 1000 or similar. In other categories unknowns have been represented by Unkn.

### 2.2 Database structure

#### 2.2.1 Overview

The database consists of one main spreadsheet named SAFER/GEO-591 (SAFER-GEO-591.xlsx). This spreadsheet contains a series of internal tables or ‘tabs’ which have also been provided as separate .csv files (e.g. LOCA.csv). These tables in the spreadsheet have been named in the same way that is specified in the AGS data format for borehole records (AGS, 2017) and are set as four-letter group names (e.g., ‘LOCA’, for location details or ‘GEOL’ for geology descriptions).

Each table contains the same top four rows where:

- Row 1 - presents a user-friendly description of the information held in that column;

- Row 2 - details the field headings which apply to the data held in that column. These headings are structured so that the excel table name e.g. GEOL is provided and followed by a further descriptor of that database field with a name which is up to 4 letters long i.e. GEOL\_TOP describes the field of the database which is the ‘depth to top of stratum’;
- Row 3 – provides the units relating to each field column; and
- Row 4 – provides the data type (i.e. if the column is a text field or numerical etc.).

In row 4, some database fields are given the data type ‘ID’ this represents a unique identifier field which allows linkage of data across tables within the database. The field LOCA\_ID will always hold the unique identifier for the data source information as described in Section 2.1. A screen shot of the ‘LOCA’ table within the SAFER/GEO-591 excel spreadsheet is provided in Figure 1.

| A                 | B           | C            | D                | E                  | F           | G                       |
|-------------------|-------------|--------------|------------------|--------------------|-------------|-------------------------|
| 1 Location ID     | Easting (X) | Northing (Y) | Ground level (Z) | Ground Level (DEM) | Final depth | General remarks on hole |
| 2 LOCA_ID         | LOCA_NATE   | LOCA_NATN    | LOCA_GL          | LOCA_DEM           | LOCA_FDEP   | LOCA_REM                |
| 3                 | m           | m            | m                | m                  | m           |                         |
| 4 ID              | 2DP         | 2DP          | 2DP              | 2DP                | 2DP         | X                       |
| 5 R_JICA_1990_B1  | 335110.94   | 3059787.08   | 1353.11          | 1332.62            | 457.20      | Harisiddhi              |
| 6 R_JICA_1990_B2  | 336761.96   | 3070477.14   | 1340.00          | 1340.06            | 79.25       | Bansbari                |
| 7 R_JICA_1990_B3  | 343131.01   | 3070089.05   | 1346.20          | 1361.34            | 241.14      | Nayapati                |
| 8 R_JICA_1990_B4  | 340314.96   | 3067783.02   | 1317.70          | 1324.45            | 305.10      | Gokarna                 |
| 9 R_JICA_1990_B5  | 337350.96   | 3063388.02   | 1317.70          | 1299.78            | 305.10      | Koteshwar               |
| 10 R_JICA_1990_B6 | 347051.02   | 3063264.21   | 1365.00          | 1346.75            | 277.67      | Bhadgaon                |
| 11 R_JICA_1990_B7 | 333665.97   | 3072182.12   | 1340.00          | 1360.32            | 201.61      | Phutung                 |
| 12 R_JICA_1990_B8 | 33822.97    | 3057742.12   | 1362.00          | 1366.72            | 290.78      | Sunakothi               |

Figure 1. Showing the first four rows of the ‘LOCA’ table of the excel spreadsheet (SAFER-GEO-591.xlsx).

## 2.3 Database tables

This section describes each table in the database separately and explains any further details relating to the quality of the meta-data. These tables have been reproduced from guidance provided in the AGS format document (AGS, 2017). In the following sections of this report, if the AGS format has been modified from the AGS standard or are representing new fields to produce a structure relevant to the data available for Nepal the table shows cells with a grey background. Additional excel sheets which combine these tables, for use in different engineering scenarios, are provided with the database. Further details of the provided combined files are provided in Appendix II.

### 2.3.1 Location details

The database holds the geospatial information relevant to each borehole record or dataset. In cases where the location of the site was difficult to determine from the original record, this was estimated from other information. For instance, evidence of location was derived from the project name, the city/area name or other details that are shown in the original record such as sketch maps. If coordinates of the site had been reported in the source, these were included directly into the database. The database

geospatial information is held in the projected coordinate system: WGS\_1984\_UTM\_Zone\_45N, Projection: Transverse Mercator. Elevation information was unavailable for some of the sites included in the database. In these cases, the site level was obtained from a Digital Elevation Model (DEM) with a 10m resolution. The DEM level at the borehole points has also been provided for the entire database, in some cases this differs from the elevation value available in the original data. The LOCA table also contains the database record quality designation LOCA\_QUAL which is described in Section 2.4. Table 2 describes the fields held within the ‘LOCA’ table in the database spreadsheet.

**Table 2 - LOCA - Location details – based on AGS (2017) used with permission.**

| Heading   | Unit | Description  | Example        | Data Type |
|-----------|------|--|----------------|-----------|
| LOCA_ID   |      | Location identifier  | R_JICA_1990_B1 | ID        |
| LOCA_NATE | m    | Easting of location based on WGS_1984_UTM_Zone_45N   | 335110.94      | 2DP       |
| LOCA_NATN | m    | Northing of location WGS_1984_UTM_Zone_45N   | 3059787.07     | 2DP       |
| LOCA_GL   | m    | Ground elevation or level relative to datum of mean sea level (m MSL)                        | 1353.11        | 2DP       |
| LOCA_DEM  | m    | Ground elevation or level from 10m resolution digital elevation model                        | 1353.11        | 2DP       |
| LOCA_REM  |      | General remarks  |                | X         |
| LOCA_FDEP | m    | Final depth  | 32.60          | 2DP       |
| LOCA_LOGQ |      | Borehole description quality based on categories described in Table 17 of Section 2.4. (1-3) | 1              | 0DP       |
| LOCA_QUAL |      | Quality designation according to Table 17 of Section 2.4. (1-11)                             | 5              | 0DP       |
| LOCA_REF  |      | Reference identifier referring to references in Appendix I.                                  | R32            | X         |

### 2.3.2 Geology

Records from boreholes or general site ground conditions are presented as metres below ground level. Prior to digitisation the borehole information was assigned a general logging quality designation. This is described in further detail in section 2.4. Most of the deep boreholes were drilled for groundwater purposes and only contain logging information available from the drilling returns. In these cases, the database contains both the original logging and a harmonised version of the descriptions to remove errors and provide additional benefits of using the database information. This involved the following methodology.

The harmonised descriptions in the database were set up according to the nomenclature used in BS 5930 (BSI, 2015). These descriptions are held in the field GEOL\_GEOL and the original source descriptions

in GEOL\_ORIG to retain the original data. The purpose of the harmonisation was to enable an assignment of the soils dominant character for future analysis. For the sources with the logging quality designation 2 the major constituent of the soil (whether it is mainly a sand, silt, gravel or clay) was not always obvious from the description. In these cases, the major constituent has been assigned by indicators in the original description. Where it was less obvious in logging, such as “silty, clayey, gravelly” the authors opted to assign the first mentioned material to be the dominant one. For the logging quality designation 1 (the geotechnically logged boreholes) this process did not need to be undertaken for the majority. However, original borehole logging has been altered in cases that a laboratory test was available, and discrepancies were encountered. After this process, although some original records were not originally to any specific geotechnical engineering logging guidelines, in this data poor region, information can be gleaned from the dataset.

The soil type within a depth interval has also been described by using a legend code, as the field LEG\_CODE does in the AGS format (AGS, 2017). These 3-digit legend codes allow distinction of soil type via a number. A soil described as a clay will always have a legend code starting with 2 i.e. a silty sandy CLAY is legend code 207. All legend codes used have been provided in Appendix III.

The field GEOL\_FORM in the database contains the interpreted geological formation of the encountered strata. For most of the database this was not presented in the original source material and is interpreted. Therefore, the geological formation name should be taken as an indication of the likely geological soil type and should not be relied upon. Where the logging quality designation is low this information is generally absent. Interpretations were based on the following.

- Where ground records are present, but not indicating whether the deposit was superficial or bedrock geology, the authors assigned a geological formation by using various indicators in the description such as descriptions “loose soil”, indicators of mixed soil such as ‘mixed silty, clayey, gravelly, sandy’, or where the word “pebbles” is used at shallow depth, this was interpreted as possible superficial deposit (geologically recent).
- Profiles easier to recognise could be allocated a geological formation name, such as those described as ‘black sticky/ plastic clay’ in the Kathmandu Valley could be interpreted to be part of the Kalimati Formation. The other sediments in the valley (i.e. from Pliocene to Pleistocene age) could sometimes be distinguished based on location and have been assigned names accordingly based on the distribution and indication of soil descriptions from the Shrestha et al. (1998) geological map.
- Bedrock geology (anything geologically older than the above) was sometimes assigned from information in logs based on loose indicators of mineralogy or rock type such as ‘sandstone’ or ‘phyllite’ and were assigned geological formation names by reference to the descriptions of strata and location on the geological map (Shrestha et al. 1998).

Common terminology for Made Ground included fill, filling soil, or listing of man-made constituents. The term “brick-bats” was taken as cobble sized pieces of man-made bricks and so any description containing this was assigned as Made Ground and given the geology code 102. The term ‘Top soil’ was observed to be used in logging as a way of describing the soil at the top of the profile, sometimes extending to depths >5m so is making probable reference to reworked or disturbed material, rather than an organic fertile layer for plant growth as is usually described by Topsoil. In these cases, the layers have been designated the geology code Topsoil (101) or 102 to allow removal from analysis.

The information held in the geology table of the database is provided in Table 3. Where additional information was given within an interval of strata, i.e. comments such as ‘between 0.0m and 0.70m bgl: becoming silty’ are held within the details table and this is structured as shown in Table 4.

**Table 3 - GEOL - Field geological descriptions – based on AGS (2017) used with permission.**

| Heading   | Unit | Description                                      | Example               | Data Type            |
|-----------|------|--|-----------------------|----------------------|
| LOCA_ID   |      | Location identifier                              | R_JICA_1990_B1        | ID                   |
| GEOL_TOP  | m    | Depth to the top of stratum                      | 16.21                 | 2DP                  |
| GEOL_BASE | m    | Depth to the base of description                 | 17.25                 | 2DP                  |
| GEOL_GEOL |      | General description of stratum <sup>(1)</sup>    | Stiff grey silty CLAY | X                    |
| GEOL_LEG  |      | Legend code                                      | 102                   | T (See Appendix III) |
| GEOL_FORM |      | Geological formation or stratum name             | Kalimati Formation    | X                    |
| GEOL_ORIG |      | Description of stratum from original data source | Stiff grey silty CLAY | X                    |

(1) Harmonised description of geological unit from the original logging data.

**Table 4 - DETL - Stratum detail descriptions – based on AGS (2017) used with permission.**

| Heading   | Unit | Description                         | Example        | Data Type |
|-----------|------|-------------------------------------|----------------|-----------|
| LOCA_ID   |      | Location identifier                 | R_JICA_1990_B1 | ID        |
| DETL_TOP  | m    | Depth to top of detail description  | 3.46           | 2DP       |
| DETL_BASE | m    | Depth to base of detail description | 3.76           | 2DP       |
| DETL_DESC |      | Detail description                  | Weathered zone | X         |

### 2.3.3 Groundwater

The depth to water strike in the boreholes has been recorded within the database. This represents the water depths as found during drilling. The water strike data from geotechnical boreholes could be indicative of either perched or the groundwater table. Data taken from monitoring of the boreholes after the period of drilling were not available. Table 5 describes the structure of the information held in the database.

*Table 5 - WSTG - Water strike – based on AGS (2017) used with permission.*

| Heading       | Unit | Description              | Example            | Data Type |
|---------------|------|--------------------------|--------------------|-----------|
| LOCA_ID       |      | Location identifier      | R_JICA_19<br>90_B1 | ID        |
| WSTG_DP<br>TH | m    | Depth to water<br>strike | 17.20              | 2DP       |

### 2.3.4 Standard Penetration Testing (SPT)

The database holds Standard Penetration Testing results or SPT-N values which have been digitised from original logs available from consultancy geotechnical boreholes. When assessing the variation which might be held within these results the following is considered.

The testing, to the authors knowledge, was generally undertaken to the methodology described in ASTM D1586-11 (2011) and involved recording blow count over three 150mm increments. This testing method is not expected to vary significantly across Nepal, however, it is expected that there is considerable variation in the results obtained due to the quality/variation of the equipment available. The meta-data usually associated with SPT testing such as hammer weight or type, diameter of the drilling rods, rod length was unavailable. Therefore, all values of SPT-N in the database are uncorrected. From the authors own observations of SPT testing undertaken in the Kathmandu Valley (Gilder et al. 2019) the methodology is via donut hammer, which is dropped using a rope with two wraps supported by a pulley. It cannot be suggested with certainty that this method is consistent throughout the database, however, Table 6 describes the database structure for the SPT results.

*Table 6 - ISPT - Standard Penetration Test results – based on AGS (2017) used with permission.*

| Heading   | Unit | Description                                    | Example        | Data Type |
|-----------|------|--|----------------|-----------|
| LOCA_ID   |      | Location identifier                            | R_JICA_1990_B1 | ID        |
| ISPT_TOP  | m    | Depth to top of test                           | 13.50          | 2DP       |
| ISPT_NVAL |      | SPT 'N' Value (uncorrected)                    | 13             | 0DP       |
| ISPT_INC1 |      | Number of blows for 1st<br>Increment (Seating) | 6              | 0DP       |
| ISPT_INC2 |      | Number of blows for 2nd<br>Increment (Seating) | 8              | 0DP       |

| <b>Table 6 - ISPT - Standard Penetration Test results (continued)</b> |             |   |                |                  |
|---|-------------|---|----------------|------------------|
| <b>Heading</b>  | <b>Unit</b> | <b>Description</b>                            | <b>Example</b> | <b>Data Type</b> |
| ISPT_INC3   |             | Number of blows for 1st Increment (Test)      | 8              | 0DP              |
| ISPT_INC4   |             | Number of blows for 2nd Increment (Test)      | 9              | 0DP              |
| ISPT_INC5   |             | Number of blows for 3rd Increment (Test)      | 9              | 0DP              |
| ISPT_INC6   |             | Number of blows for 4th Increment (Test)      | 9              | 0DP              |
| ISPT_PEN1   | mm          | Penetration for 1st Increment (Seating Drive) | 50             | 0DP              |
| ISPT_PEN2   | mm          | Penetration for 2nd Increment (Seating Drive) | 50             | 0DP              |
| ISPT_PEN3   | mm          | Penetration for 1st Increment (Test)          | 75             | 0DP              |
| ISPT_PEN4   | mm          | Penetration for 2nd Increment (Test)          | 75             | 0DP              |
| ISPT_PEN5   | mm          | Penetration for 3rd Increment (Test)          | 75             | 0DP              |
| ISPT_PEN6   | mm          | Penetration for 4th Increment (Test)          | 75             | 0DP              |

### 2.3.5 Velocity data

The geophysical data within the database is provided from sources that undertook downhole measurement techniques. It is understood in the Kathmandu Valley that the available testing was undertaken by direct method, i.e. involving only one receiver within the borehole. Where the original time of inclined arrivals were available the corrected travel times have been provided in the database. This corrected travel time,  $t_c$  is calculated from the raw dataset using equation 1 (e.g. Kim et al. 2004):

$$t_c = D \frac{t}{R} \quad (1)$$

where  $t_c$  is the corrected travel time,  $D$  is the testing depth from ground surface,  $t$  is the arrival time of the wave in the inclined direction and  $R$  is the horizontal distance between source and receiver. The average shear-wave velocity is obtained by plotting the corrected travel time with depth and the velocity of the layer is equal to the slope of the fitted line across an interval of depth. The calculated average P & S wave velocities have been presented at the geophysical intervals defined by plotting the corrected travel-time with depth i.e. the slope of the fitted lines through each interval of data which exhibits a similar linear trend. The retention of the time data allows future users to understand the interval spacing that the geophysical testing was collected. However, for some of the data in the database only the velocities between intervals were available so the original time meta-data was not available. Table 7 describes the structure of the database for the time data and Table 8 describes the structure of the calculated velocities.

**Table 7 – TIME – Downhole geophysical test corrected time results**

| Heading   | Unit | Description   | Example        | Data Type |
|-----------|------|---|----------------|-----------|
| LOCA_ID   |      | Location identifier                                       | R_JICA_1990_B1 | ID        |
| TIME_TOP  | m    | Depth to the top of test interval                         | 2.45           | 2DP       |
| TIME_BASE | m    | Depth to the base of test interval (position of receiver) | 3.45           | 2DP       |
| TIME_PTIM | ms   | P-wave corrected travel time                              | 2.84           | 2DP       |
| TIME_STIM | ms   | Shear wave corrected travel time                          | 8.06           | 2DP       |
| TIME_RDIS | m    | Horizontal distance from source and receiver              | 2              | 2DP       |

**Table 8 – VELO – Downhole geophysical test calculated velocities**

| Heading   | Unit | Description                                   | Example        | Data Type |
|-----------|------|---|----------------|-----------|
| LOCA_ID   |      | Location identifier                           | R_JICA_1990_B1 | ID        |
| VELO_TOP  | m    | Depth to the top of geophysical interval      | 2.45           | 2DP       |
| VELO_BASE | m    | Depth to the base of geophysical interval     | 3.45           | 2DP       |
| VELO_PVEL | m/s  | Calculated P-wave velocity <sup>(1)</sup>     | 256            | 2DP       |
| VELO_SVEL | m/s  | Calculated shear wave velocity <sup>(1)</sup> | 125            | 2DP       |

<sup>(1)</sup> Calculated from geophysical intervals as recommended for direct downhole seismic methods described in Kim et al. (2004) or values presented from the original source data.

### 2.3.6 Geotechnical Laboratory Testing

This section describes the structure of the geotechnical laboratory testing available. Indicators from original test certificates suggest that ASTM standard practices are followed in Nepal. To include each test in the database, the samples from the boreholes have been given a sample unique identifier so that different tests undertaken on the same soils can be compared. This identifier is held within the SAMP\_ID field. An additional excel sheet ‘TEST.xlsx’ is provided with the database with selected geotechnical testing sort by LOCA\_ID and SAMP\_ID as a sample per row for additional usability.

## Particle Size Distribution

Data from particle size distribution tests indicates that the ASTM standard practice for soil classification has been used (ASTM D2487 – 17). Where a clay or silt is defined as the material passing a No. 200 (0.075 mm or 75-µm) U.S standard sieve. Similarly, a gravel will pass a 75 mm sieve but be retained on a 4.75 mm sieve and sand is between 4.75 mm and 0.075 mm (75-µm). Fine grained soils are classified as 50% or more passing the 0.075 mm sieve. Where sedimentation testing was available the silt/clay proportions are provided as GRAG\_SILT and GRAG\_CLAY fields. In some cases, the original particle size distribution meta-data was not available, but a soil classification group symbol was provided (i.e. see Table 1 in ASTM D2487 – 17). The structure is provided in Table 9.

*Table 9 – GRAG - Particle Size Distribution – based on AGS (2017) used with permission.*

| Heading   | Unit | Description  | Example        | Data Type |
|-----------|------|--|----------------|-----------|
| LOCA_ID   |      | Location identifier  | R_JICA_1990_B1 | ID        |
| SAMP_TOP  | m    | Depth to top of sample   | 24.55          | 2DP       |
| SAMP_ID   |      | Sample unique global identifier                                | 5              | ID        |
| SPEC_DPTH | m    | Depth to top of test specimen                                  | 24.55          | 2DP       |
| GRAG_VCRE | %    | Percentage of material tested greater than 75mm (cobbles)      | 0.0            | 1DP       |
| GRAG_GRAV | %    | Percentage of material tested in range 75mm to 4.75mm (gravel) | 30.1           | 1DP       |
| GRAG_SAND | %    | Percentage of material tested in range 4.75mm to 75um (sand)   | 40.4           | 1DP       |
| GRAG_SILT | %    | Percentage of material tested in range 75um to 2um (silt)      | 14.5           | 1DP       |
| GRAG_CLAY | %    | Percentage of material tested less than 2um (clay)             | 15.0           | 1DP       |
| GRAG_FINE | %    | Percentage less than 75um                                      | 29.5           | 1DP       |

## Moisture content and Atterberg limits

Moisture content and atterberg limits are described in Table 10 and Table 11 respectively.

*Table 10 – LNMC - Moisture Content tests – based on AGS (2017) used with permission.*

| Heading  | Unit | Description                     | Example        | Data Type |
|----------|------|---------------------------------|----------------|-----------|
| LOCA_ID  |      | Location identifier             | R_JICA_1990_B1 | ID        |
| SAMP_TOP | m    | Depth to top of sample          | 24.55          | 2DP       |
| SAMP_ID  |      | Sample unique global identifier | 5              | ID        |
| LNMC_MC  | %    | Water/moisture content          | 57             | X         |

**Table 11 – LLPL - Liquid and Plastic Limit tests – based on AGS (2017) used with permission.**

| Heading  | Unit | Description                     | Example        | Data Type |
|----------|------|---------------------------------|----------------|-----------|
| LOCA_ID  |      | Location identifier             | R_JICA_1990_B1 | ID        |
| SAMP_TOP | m    | Depth to top of sample          | 24.55          | 2DP       |
| SAMP_ID  |      | Sample unique global identifier | 5              | ID        |
| LLPL_LL  | %    | Liquid limit                    | 62             | 2SF       |
| LLPL_PL  | %    | Plastic limit                   | 38 or NP       | XN        |
| LLPL_PI  |      | Plasticity Index                | 23             | 2SF       |

## Density tests

All density tests including particle density (Table 12) and bulk, dry and saturated density (Table 13) are structured as below.

**Table 12 – LPDN - Particle Density tests – based on AGS (2017) used with permission.**

| Heading   | Unit              | Description                     | Example        | Data Type |
|-----------|-------------------|---------------------------------|----------------|-----------|
| LOCA_ID   |                   | Location identifier             | R_JICA_1990_B1 | ID        |
| SAMP_TOP  | m                 | Depth to top of sample          | 24.55          | 2DP       |
| SAMP_ID   |                   | Sample unique global identifier | 5              | ID        |
| LPDN_PDEN | g/cm <sup>3</sup> | Particle density                | 2.65           | XN        |

**Table 13 – LDEN - Density tests – based on AGS (2017) used with permission.**

| Heading   | Unit              | Description                     | Example        | Data Type |
|-----------|-------------------|---------------------------------|----------------|-----------|
| LOCA_ID   |                   | Location identifier             | R_JICA_1990_B1 | ID        |
| SAMP_TOP  | m                 | Depth to top of sample          | 24.55          | 2DP       |
| SAMP_ID   |                   | Sample unique global identifier | 5              | ID        |
| LDEN_BDEN | g/cm <sup>3</sup> | Bulk density                    | 1.66           | 2DP       |
| LDEN_DDEN | g/cm <sup>3</sup> | Dry density                     | 1.06           | 2DP       |
| LDEN_WDEN | g/cm <sup>3</sup> | Saturated density               | 1.70           | 2DP       |

## Total and effective stress testing

The total stress and effective stress testing in the database has been split into two tables (Table 14 and Table 15 respectively). In Table 14 the field TRIG\_CU represents the undrained shear strength at failure ( $c_u$ ) which is understood to have been undertaken by two methods of total stress testing. The method of test is defined by the field TRIG\_TYPE, which indicates if testing was undertaken by either unconsolidated quick undrained with a single stage (UU), or by Unconfined Compressive test (UNC) as per AGS (2017).

**Table 14 – TRIG - Triaxial tests - Total stress – based on AGS (2017) used with permission.**

| Heading   | Unit | Description                         | Example        | Data Type |
|-----------|------|-------------------------------------|----------------|-----------|
| LOCA_ID   |      | Location identifier                 | R_JICA_1990_B1 | ID        |
| SAMP_TOP  | m    | Depth to top of sample              | 24.55          | 2DP       |
| SAMP_ID   |      | Sample unique global identifier     | 5              | ID        |
| TRIG_TYPE |      | Test type                           | UU             | T         |
| TRIG_COND |      | Sample condition                    | Undisturbed    | T         |
| TRIG_CU   | kPa  | Undrained Shear Strength at failure | 180            | 0DP       |

The effective stress testing is understood to have been undertaken by ring shear tests, indicated by the field SHBG\_TYPE. This was undertaken across three load stages. It is not known if the samples were remoulded or undisturbed. The values of cohesion ( $c'$ ) and phi ( $\phi'$ ) are provided.

**Table 15 – SHBG – Shear box testing - effective stress – based on AGS (2017) used with permission.**

| Heading   | Unit | Description                                      | Example        | Data Type |
|-----------|------|--|----------------|-----------|
| LOCA_ID   |      | Location identifier                              | R_JICA_1990_B1 | ID        |
| SAMP_TOP  | m    | Depth to top of sample                           | 24.55          | 2DP       |
| SAMP_ID   |      | Sample unique global identifier                  | 5              | ID        |
| SHBG_TYPE |      | Test type  | RSHEAR         | T         |
| SHBG_COH  | kPa  | Peak cohesion intercept associated with SHBG_PHI | 1              | 1DP       |
| SHBG_PHI  | deg  | Peak angle of friction                           | 32.0           | 1DP       |

## Consolidation testing

Lastly, a small amount of consolidation testing is available for the Kathmandu Valley. The data structure for the consolidation laboratory tests are provided in Table 16.

**Table 16 – CONS - Consolidation tests – based on AGS (2017) used with permission.**

| <b>Heading</b> | <b>Unit</b>                      | <b>Description</b>  | <b>Example</b> | <b>Data Type</b> |
|----------------|----------------------------------|---|----------------|------------------|
| SAMP_TOP       | m                                | Depth to top of sample  | 24.55          | 2DP              |
| SAMP_ID        |                                  | Sample unique global identifier   | 5              | ID               |
| CONS_INCF      | kPa                              | Stress at end of stress increment/decrement                               | 400            | 0DP              |
| CONS_CVRT      | cm <sup>2</sup> /s <sup>ec</sup> | Coefficient of consolidation over stress increment (cv)                   | 0.0263         | 4DP              |
| CONS_INMV      | cm <sup>2</sup> /kg              | Reported coefficient of volume compressibility over stress increment (mv) | 0.32           | 2SF              |
| CONS_CONS      |                                  | Slope of consolidation curve Compression Index (Cc)                       | 0.122          | 3DP              |
| CONS_REBO      |                                  | Slope of rebound curve Swell Index (Cr)                                   | 0.029          | 3DP              |

## 2.4 Database quality designation

All database source information has been assigned a data quality number which is based on the borehole logging quality and the amount of meta-data which is associated with each borehole location. Where the borehole logging descriptions were considered reliable (i.e. geotechnical boreholes) or less reliable (logging is based on the drilling returns) these have been put into borehole description categories 1 and 2 respectively. Category 3 is where no geological information is available. This is held within the field LOCA\_LOGQ in the database. The data is further separated by whether each location contains accompanying geophysical tests, geotechnical *in situ* tests or geotechnical laboratory testing. The variations held in the database are set out in Table 17. This information is held within the LOCA table of the database spreadsheet in field LOCA\_QUAL.

*Table 17 – Quality categories*

| Borehole descriptions <sup>(1)</sup> |     |   | Geophysical testing | In situ testing | Geotechnical laboratory testing | Quality Category |
|--------------------------------------|-----|---|---------------------|-----------------|---------------------------------|------------------|
| 1                                    | 2   | 3 |                     |                 |                                 |                  |
| Yes                                  |     |   | Yes                 | Yes             | Yes                             | 1                |
| Yes                                  |     |   | Yes                 | No              | No                              | 2                |
| Yes                                  |     |   | No                  | Yes             | Yes                             | 3                |
| Yes                                  |     |   | No                  | Yes             | No                              | 4                |
| Yes                                  |     |   | No                  | No              | Yes                             | 5                |
|                                      | Yes |   | Yes                 | No              | No                              | 6                |
|                                      | Yes |   | No                  | Yes             | No                              | 7                |
|                                      | Yes |   | No                  | No              | No                              | 8                |
|                                      | Yes |   | No                  | Yes             | Yes                             | 9                |
|                                      | Yes |   | No                  | Yes             | No                              | 10               |
|                                      | Yes |   | No                  | No              | Yes                             | 11               |

(1) Borehole description quality categories: 1. Contains engineering/geotechnical soil and rock descriptions 2. The descriptions of borehole recovery are based on the drill cuttings (i.e. as is undertaken in water wells) so logging is based on the drilling slurry. 3. There is no geological information.

### 3 DATABASE STATISTICS

Appendix I: SAFER Database Sources provides a summary of all the borehole locations or sites with testing results that are included in the database including the reference ID, the borehole ID's the no of borehole locations or sites, project location and general ground conditions. Appendix IV: presents each record within the database, including the easting, northings, location, material types found in each borehole and the borehole final depths. The count of *in situ* geotechnical testing, geotechnical laboratory testing and individual geophysical velocity measurements for each of the logging quality classes described in Section 2.4 is provided in Table 18.

**Table 18 – Distribution of database information across logging quality categories (1-3)**

| Log description quality | Count      |              |            |            |            |            |            |            |            |            |           |      |
|-------------------------|------------|--------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|------|
|                         | LOCA       | LOGQ         | LOCA       | ISPT       | VELO       | LNMC       | LLPL       | GRAG       | LDEN       | LPDN       | TRIG      | SHBG |
| 1                       |            | 264<br>(45%) | 3295       | 96         | 320        | 198        | 370        | 168        | 193        | 32         | 105       | 23   |
| 2                       |            | 220<br>(37%) | 67         | 14         | 0          | 0          | 0          | 0          | 0          | 0          | 0         | 0    |
| 3                       |            | 107<br>(18%) | 235        | 0          | 168        | 163        | 51         | 51         | 113        | 87         | 16        | 56   |
| <b>TOTAL</b>            | <b>591</b> | <b>3597</b>  | <b>110</b> | <b>488</b> | <b>361</b> | <b>421</b> | <b>219</b> | <b>306</b> | <b>119</b> | <b>121</b> | <b>79</b> |      |

*LOCA* = No. of BH locations or sites where test data is available.

*ISPT* = No. of SPT tests

*VELO* = No. of individual *in situ* velocity measurements undertake at intervals at that location

*LNMC* = No. of natural moisture content tests

*LLPL* = No. of Atterberg Limits

*GRAG* = No. of particle size distribution or sedimentation tests

*LDEN* = No. of density tests

*LPDN* = No. of specific gravity tests

*TRIG* = No. of undrained shear strength tests

*SHBG* = No. of effective stress tests

*CONS* = No. of consolidation tests

Also Table 19 provides the full details of the logging quality category, count of *in situ* geotechnical testing, geotechnical laboratory testing and individual geophysical velocity measurements for each of the records.

**Table 19 – Database geotechnical properties and in situ testing distribution**

| Source | Code  | Year  | Log quality category | Overall quality | Counts |                       |                           |               |                            |         |                  |              |                  |               |
|--------|-------|-------|----------------------|-----------------|--------|-----------------------|---------------------------|---------------|----------------------------|---------|------------------|--------------|------------------|---------------|
|        |       |       |                      |                 | SPT's  | Velocity measurements | Natural Moisture Contents | Liquid Limits | Particle size distribution | Density | Specific Gravity | Total Stress | Effective stress | Consolidation |
| IND    | Baba  | 2008  | 1                    | 4               | 103    | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Bakh  | 2006  | 1                    | 1               | 27     | 14                    | 37                        | 6             | 7                          | 3       | 7                | 2            | 1                | 2             |
|        |       |       | 3                    | 3               | 33     | 0                     | 44                        | 9             | 14                         | 2       | 7                | 1            | 3                | 2             |
|        | Bala  | 2018  | 1                    | 3               | 88     | 0                     | 16                        | 6             | 16                         | 16      | 6                | 7            | 8                | 6             |
|        | Balk  | 2009  | 1                    | 4               | 68     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |       |       | 1                    | 4               | 58     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | 2009a | 2009b | 1                    | 3               | 75     | 0                     | 0                         | 9             | 9                          | 0       | 0                | 0            | 0                | 1             |
|        |       |       | 4                    | 4               | 9      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Balu  | 2004  | 1                    | 4               | 14     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Bans  | 2007  | 1                    | 1               | 40     | 12                    | 49                        | 3             | 47                         | 46      | 32               | 0            | 0                | 0             |
|        |       |       | 5                    | 5               | 0      | 0                     | 82                        | 1             | 69                         | 77      | 34               | 0            | 0                | 0             |
|        | Batt  | 2005  | 1                    | 4               | 30     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Bhat  | 2008  | 1                    | 4               | 26     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Biju  | 1000  | 1                    | 4               | 48     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Bish  | 2007  | 1                    | 4               | 65     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Chan  | 2007  | 1                    | 3               | 26     | 0                     | 6                         | 6             | 0                          | 0       | 4                | 0            | 6                | 4             |
|        |       |       | 3                    | 11              | 0      | 0                     | 3                         | 3             | 0                          | 0       | 2                | 0            | 3                | 1             |
|        | Chys  | 2015  | 1                    | 3               | 35     | 0                     | 21                        | 18            | 21                         | 15      | 21               | 2            | 3                | 1             |
|        | Dhap  | 2008  | 1                    | 3               | 201    | 0                     | 0                         | 10            | 35                         | 0       | 0                | 0            | 26               | 0             |
|        |       |       | 3                    | 11              | 0      | 0                     | 0                         | 3             | 3                          | 0       | 0                | 0            | 2                | 0             |

*Table 19 – Database geotechnical properties and in situ testing distribution (continued)*

| Source | Code | Year | Log quality category | Overall quality | Counts |                       |                           |               |                            |         |                  |              |                  |               |
|--------|------|------|----------------------|-----------------|--------|-----------------------|---------------------------|---------------|----------------------------|---------|------------------|--------------|------------------|---------------|
|        |      |      |                      |                 | SPT's  | Velocity measurements | Natural Moisture Contents | Liquid Limits | Particle size distribution | Density | Specific Gravity | Total Stress | Effective stress | Consolidation |
| IND    | Dhap | 2009 | 1                    | 4               | 50     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Dhob | 1000 | 1                    | 4               | 38     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Dhum | 2007 | 1                    | 4               | 30     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Dill | 2008 | 1                    | 4               | 33     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Ghat | 2009 | 1                    | 4               | 40     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Goda | 2018 | 1                    | 3               | 24     | 0                     | 14                        | 12            | 11                         | 2       | 15               | 2            | 0                | 0             |
|        | Gyan | 2008 | 1                    | 4               | 23     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Hanu | 1002 | 1                    | 4               | 26     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Hatt | 1000 | 1                    | 4               | 78     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Jaga | 2010 | 1                    | 3               | 20     | 0                     | 4                         | 6             | 8                          | 0       | 0                | 0            | 4                | 2             |
|        | Kada | 1000 | 1                    | 4               | 117    | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Kama | 2008 | 1                    | 4               | 106    | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Kaus | 2017 | 1                    | 4               | 80     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Kote | 2008 | 1                    | 3               | 115    | 0                     | 0                         | 17            | 0                          | 0       | 0                | 0            | 30               | 0             |
|        | Kule | 2007 | 1                    | 4               | 39     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Kupo | 1000 | 1                    | 3               | 16     | 0                     | 0                         | 0             | 0                          | 7       | 0                | 0            | 0                | 0             |
|        | Lazi | 2008 | 1                    | 4               | 26     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Mach | 2012 | 1                    | 4               | 40     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Naxa | 1000 | 1                    | 4               | 48     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |

*Table 19 – Database geotechnical properties and in situ testing distribution (continued)*

| Source | Code | Year  | Log quality category | Overall quality | Counts |                       |                           |               |                            |         |                  |              |                  |               |
|--------|------|-------|----------------------|-----------------|--------|-----------------------|---------------------------|---------------|----------------------------|---------|------------------|--------------|------------------|---------------|
|        |      |       |                      |                 | SPT's  | Velocity measurements | Natural Moisture Contents | Liquid Limits | Particle size distribution | Density | Specific Gravity | Total Stress | Effective stress | Consolidation |
| IND    | Pani | 2008  | 1                    | 4               | 26     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Pulc | 2008  | 1                    | 4               | 52     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Ravi | 2008  | 1                    | 4               | 47     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Sane | 1000  | 1                    | 4               | 31     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |      | 1001  | 1                    | 4               | 22     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | 1002 | 1     | 4                    | 23              | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |      | 2007  | 1                    | 3               | 50     | 0                     | 10                        | 15            | 0                          | 0       | 4                | 0            | 10               | 3             |
|        | 2009 | 1     | 4                    | 64              | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |      | 2009a | 1                    | 4               | 68     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Sank | 2008  | 1                    | 4               | 65     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Sano | 2008  | 1                    | 4               | 44     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Sina | 2006  | 1                    | 3               | 40     | 0                     | 5                         | 9             | 0                          | 0       | 3                | 0            | 5                | 2             |
|        | Solt | 2007  | 1                    | 4               | 42     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |      | 2008  | 1                    | 4               | 102    | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Taha | 2008a | 1                    | 4               | 50     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |      | 2007  | 1                    | 4               | 217    | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Thad | 2009  | 1                    | 4               | 80     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Tokh | 2007  | 1                    | 4               | 40     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | Unkn | 1001  | 1                    | 4               | 35     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| R      | Agso | 1997  | 2                    | 8               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |

*Table 19 – Database geotechnical properties and in situ testing distribution (continued)*

| Source | Code | Year | Log quality category | Overall quality | Counts |                       |                           |               |                            |         |                  |              |                  |               |
|--------|------|------|----------------------|-----------------|--------|-----------------------|---------------------------|---------------|----------------------------|---------|------------------|--------------|------------------|---------------|
|        |      |      |                      |                 | SPT's  | Velocity measurements | Natural Moisture Contents | Liquid Limits | Particle size distribution | Density | Specific Gravity | Total Stress | Effective stress | Consolidation |
| Bala   | 1992 | 2    | 8                    | 0               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Bhak   | 1992 | 2    | 8                    | 0               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Goka   | 1992 | 2    | 8                    | 0               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| JICA   | 1990 | 2    | 7                    | 37              | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |      |      | 8                    | 0               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        | 2002 | 1    | 1                    | 150             | 45     | 18                    | 30                        | 117           | 0                          | 51      | 15               | 0            | 0                | 0             |
|        | 2014 | 1    | 4                    | 94              | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| JRAP   | 2016 | 1    | 2                    | 0               | 19     | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Kath   | 1000 | 2    | 8                    | 0               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Lali   | 1000 | 2    | 8                    | 0               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Pasu   | 1000 | 2    | 8                    | 0               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Praa   | 1000 | 2    | 8                    | 0               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Unkn   | 1000 | 3    | 10                   | 190             | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| RES    | Dara | 2002 | 1                    | 3               | 13     | 0                     | 6                         | 6             | 5                          | 0       | 3                | 1            | 2                | 0             |
|        |      |      |                      | 5               | 0      | 0                     | 8                         | 14            | 11                         | 0       | 6                | 2            | 6                | 0             |
| Kate   | 1996 | 3    | 9                    | 45              | 0      | 56                    | 48                        | 48            | 0                          | 33      | 8                | 11           | 11               |               |
|        |      |      |                      | 11              | 0      | 0                     | 109                       | 109           | 0                          | 51      | 78               | 79           | 0                | 44            |
| Pagl   | 2018 | 1    | 4                    | 10              | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Pokh   | 2006 | 2    | 3                    | 30              | 5      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |      |      |                      | 6               | 0      | 9                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |

*Table 19 – Database geotechnical properties and in situ testing distribution (continued)*

| Source | Code | Year | Log quality category | Overall quality | Counts |                       |                           |               |                            |         |                  |              |                  |               |
|--------|------|------|----------------------|-----------------|--------|-----------------------|---------------------------|---------------|----------------------------|---------|------------------|--------------|------------------|---------------|
|        |      |      |                      |                 | SPT's  | Velocity measurements | Natural Moisture Contents | Liquid Limits | Particle size distribution | Density | Specific Gravity | Total Stress | Effective stress | Consolidation |
| Safe   | 2018 | 2018 | 1                    | 1               | 25     | 6                     | 0                         | 12            | 0                          | 0       | 0                | 0            | 0                | 0             |
|        |      |      |                      | 3               | 10     | 0                     | 0                         | 9             | 0                          | 0       | 0                | 0            | 0                | 0             |
| Saka   | 2001 | 2001 | 2                    | 8               | 0      | 0                     | 0                         | 0             | 0                          | 0       | 0                | 0            | 0                | 0             |

## 4 SUMMARY

The project Seismic Safety and Resilience of Schools in Nepal (SAFER) has produced a database comprising over 500 boreholes in various geological deposits throughout the Kathmandu Valley. Where available, accompanying ground investigation (GI) data has been supplied. The database also contains all shear-wave velocity ( $V_s$ ) measurements that were made available through the duration of the project which are relevant to site response analysis for the Kathmandu Valley. The data originated from a variety of literature and industrial sources. The data have been made available for download on the data.bris University of Bristol Research Data Repository. The data format is inspired by the AGS format (AGS, 2017). It is hoped that the database will be a useful source of information for researchers and practitioners. Users of the database are encouraged to let the authors know of any errors or omissions they may find and are welcomed to add the data contained in the database to their own databases.

## 5 REPORT REFERENCES

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# Appendix I: SAFER Database Sources

*Table 20 – Database source information*

| Reference ID | Source | Code | Year  | ID's  | Count | Project location    | General ground conditions | Final depth range (m bgl) *unknown |
|--------------|--------|------|-------|---|-------|---------------------|---------------------------|------------------------------------|
| R1           | IND    | Baba | 2008  | BH1, BH2, BH3, BH4, BH5                     | 5     | Babarmahal          | MG, Sand, Clay, Silt      | 35                                 |
| R2           | IND    | Bakh | 2006  | BH1, BH2, BH3, BH4, BH5, BH6                | 6     | Bakhundol, Lalitpur | MG, Clay, Silt, Sand      | 15-30                              |
| R3           | IND    | Bala | 2018  | BH1, BH2, BH3, BH4, BH5, BH6, BH7, BH8      | 8     | Balaju              | Clay, Sand, MG            | 16                                 |
| R4           | IND    | Balk | 2009  | BH1, BH2, BH3, BH4                          | 4     | Balkumari, Lalitpur | MG, Silt, Sand            | 25-30                              |
| R5           | IND    |      | 2009a | BH1, BH2, BH3                               | 3     | Balkumari, Lalitpur | MG, Silt                  | 30                                 |
| R6           | IND    |      | 2009b | A1, B1, B2, F1, F2, F3, F4                  | 7     | Balkumari           | Sand, Silt, Clay          | 10-30                              |
| R7           | IND    | Balu | 2004  | BH4, BH5                                    | 2     | Baluwatar           | MG, Sand, Clay, Silt      | 10                                 |
| R8           | IND    | Bans | 2007  | BH1, BH2, BH3, BH4, BH5, BH6, BH7, BH8, BH9 | 9     | Bansbari            | Sand, Clay, MG, Silt      | 15-35                              |
| R9           | IND    | Batt | 2005  | BH1, BH2, BH3                               | 3     | Battishputali       | MG, Silt, Sand            | 15                                 |
| R10          | IND    | Bhat | 2008  | BH1, BH2                                    | 2     | Bhatbhateni         | MG, Sand, Silt            | 20                                 |
| R11          | IND    | Biju | 1000  | BH1, BH2, BH3, BH4, BH5                     | 5     | Bijulibazar         | MG, Sand, Silt, Clay      | 15                                 |
| R12          | IND    | Bish | 2007  | BH1, BH2, BH3, BH4, BH5                     | 5     | Bishalnagar         | MG, Sand, Silt            | 20                                 |
| R13          | IND    | Chan | 2007  | BH4, BH5                                    | 2     | Chandol             | Sand, Silt                | 20*                                |

*Table 20 – Database source information (continued)*

| Reference ID | Source | Code | Year | ID's   | Count | Project location                             | General ground conditions             | Final depth range (m bgl) *unknown |
|--------------|--------|------|------|--|-------|--|---------------------------------------|------------------------------------|
| R14          | IND    | Chys | 2015 | BH1, BH2, BH3, BH4, BH5                      | 5     | Chyasal, Lalitpur                            | Sand, Silt, Gravel, MG                | 12                                 |
| R15          | IND    | Dhap | 2008 | BH1, BH2, BH3, BH4, BH5, BH6, BH7, BH8, BH9  | 9     | Dhapakhel                                    | MG, Clay, Gravel, Sand, Silt, Unknown | 35*                                |
| R16          | IND    |      | 2009 | BH1, BH2, BH3, BH4, BH5                      | 5     | Dhapasi, Tokha                               | MG, Sand, Silt, Gravel                | 25                                 |
| R17          | IND    | Dhob | 1000 | BH1, BH2, BH3, BH4, BH5, BH6, BH7            | 7     | Dhobighat, Lalitpur                          | MG, Silt, Sand                        | 5-15                               |
| R18          | IND    | Dhum | 2007 | BH1, BH2, BH3                                | 3     | Dhumberahi                                   | MG, Sand, Silt                        | 20-21                              |
| R19          | IND    | Dill | 2008 | BH1, BH2, BH3                                | 3     | Dillibazar, Charkhal, Bajaj - Service Centre | MG, Sand, Silt                        | 20                                 |
| R20          | IND    | Ghat | 2009 | BH1, BH2, BH3, BH4                           | 4     | Ghattekulo                                   | MG, Silt, Sand                        | 15                                 |
| R21          | IND    | Goda | 2018 | BH1, BH2, BH3                                | 3     | Godawori, Lalitpur                           | MG, Clay, Gravel                      | 12                                 |
| R22          | IND    | Gyan | 2008 | BH1, BH2                                     | 2     | Gyaneshwor                                   | MG, Sand, Clay, Silt                  | 15-20                              |
| R23          | IND    | Hanu | 1002 | BH1, BH2                                     | 2     | Hanumansthan                                 | MG, Sand, Silt                        | 20                                 |
| R24          | IND    | Hatt | 1000 | BH1, BH2, BH3, BH4, BH5, BH6                 | 6     | Hattiban                                     | MG, Silt, Gravel, Sand                | 20                                 |
| R25          | IND    | Jaga | 2010 | BH1, BH2                                     | 2     | Jagati, Bhakatapur                           | Sand, Silt, Gravel                    | 16                                 |
| R26          | IND    | Kada | 1000 | BH1, BH2, BH3, BH4, BH5, BH6, BH7, BH8, BH10 | 9     | Kadaghari                                    | Sand, Silt                            | 20                                 |
| R27          | IND    | Kama | 2008 | BH1, BH2, BH3, BH4, BH5, BH6, BH7            | 7     | Kamalpokhari                                 | MG, Sand, Silt                        | 20-25                              |
| R28          | IND    | Kaus | 2017 | BH1, BH2, BH3                                | 3     | Kaushaltar, Bhaktapur                        | Silt, Sand, Clay, MG                  | 10-15                              |

*Table 20 – Database source information (continued)*

| Reference ID | Source | Code | Year  | ID's                    | Count | Project location   | General ground conditions             | Final depth range (m bgl) *unknown |
|--------------|--------|------|-------|-------------------------|-------|--------------------|---------------------------------------|------------------------------------|
| R29          | IND    | Kote | 2008  | BH1, BH2, BH3, BH4, BH5 | 5     | Koteshwor          | MG, Sand, Silt, Clay                  | 35                                 |
| R30          | IND    | Kule | 2007  | BH1, BH2, BH3           | 3     | Kuleshwor          | MG, Gravel, Silt, Sand                | 20                                 |
| R31          | IND    | Kupo | 1000  | BH1, BH2                | 2     | Kupondole          | MG, Clay, Unknown                     | 12-15                              |
| R32          | IND    | Lazi | 2008  | BH3, BH4                | 2     | Lazimpat           | MG, Sand, Silt                        | 20                                 |
| R33          | IND    | Mach | 2012  | BH1, BH2, BH3           | 3     | Machhegaun         | MG, Silt, Gravel                      | 15                                 |
| R34          | IND    | Naxa | 1000  | BH1, BH2, BH3           | 3     | Naxal              | MG, Sand, Silt                        | 25                                 |
| R35          | IND    | Pani | 2008  | BH1, BH2                | 2     | Panipokhari        | MG, Silt, Sand                        | 20                                 |
| R36          | IND    | Pulc | 2008  | BH1, BH2, BH3           | 3     | Pulchowk, Lalitpur | MG, Silt, Clay, Sand                  | 25-30                              |
| R37          | IND    | Ravi | 2008  | BH1, BH2, BH3, BH4      | 4     | Ravibhawan, Ktm    | MG, Silt                              | 20-40                              |
| R38          | IND    | Sane | 1000  | BH1, BH2, BH3           | 3     | Sanepa, Lalitpur   | MG, Silt, Gravel, Sand                | 15-17                              |
| R39          | IND    |      | 1001  | BH1, BH2                | 2     | Sanepa, Lalitpur   | MG, Silt, Clay                        | 20                                 |
| R40          | IND    |      | 1002  | BH1, BH2                | 2     | Sanepa, Lalitpur   | MG, Clay                              | 20                                 |
| R41          | IND    |      | 2007  | BH1, BH2, BH3, BH4, BH5 | 5     | Sanepa, Lalitpur   | MG, Silt, Sand                        | 15                                 |
| R42          | IND    |      | 2009  | BH1, BH2, BH3, BH4, BH5 | 5     | Sanepa, Lalitpur   | Silt, MG                              | 25                                 |
| R43          | IND    |      | 2009a | BH1, BH2, BH3           | 3     | Sanepa, Lalitpur   | MG, Silt, Gravel, Clay, Sand, Unknown | 35                                 |
| R44          | IND    | Sank | 2008  | BH1, BH2, BH3, BH4, BH5 | 5     | Sankhamul          | MG, Sand, Silt                        | 20                                 |

*Table 20 – Database source information (continued)*

| Reference ID | Source | Code | Year  | ID's  | Count | Project location | General ground conditions                  | Final depth range (m bgl) *unknown |
|--------------|--------|------|-------|---|-------|------------------|--|------------------------------------|
| R45          | IND    | Sano | 2008  | BH1, BH2, BH3   | 3     | Sanogaucharan    | MG, Clay, Sand, Silt, Gravel               | 25                                 |
| R46          | IND    | Sina | 2006  | BH1, BH2, BH3, BH4, BH5   | 5     | Sinamangal       | Sand, Silt, MG                             | 12                                 |
| R47          | IND    |      | 2007  | BH1, BH2, BH3, BH4, BH5   | 5     | Soltimod         | MG, Silt                                   | 12-15                              |
| R48          | IND    | Solt | 2008  | BH1, BH2, BH3, BH4, BH5, BH6  | 6     | Soltimod         | MG, Silt, Sand                             | 25-35                              |
| R49          | IND    |      | 2008a | BH1, BH2, BH3, BH4, BH5   | 5     | Soltimod         | MG, Silt                                   | 15                                 |
| R50          | IND    | Taha | 2007  | BH1, BH2, BH3, BH4, BH5, BH6, BH7, BH8, BH9, BH10, BH11, BH12, BH13, BH14, BH15, BH16, BH17, BH18, BH19, BH20 | 20    | Tahachal         | MG, Silt, Sand                             | 15-20                              |
| R51          | IND    | Thad | 2009  | BH1, BH2, BH3, BH4  | 4     | Thadodunga       | Gravel, Sand, Silt                         | 30                                 |
| R52          | IND    | Tokh | 2007  | BH1, BH2, BH3, BH4, BH5   | 5     | Tokha            | Sand                                       | 8                                  |
| R53          | IND    | Unkn | 1001  | BH1, BH2, BH3, BH4, BH5   | 5     | Unknown          | MG, Sand, Silt, Clay                       | 10-13                              |
| R54          | R      | Agso | 1997  | AG68  | 1     | Agso             | MG, Silt, Clay, Sand, Cobbles, Bedrock     | 189                                |
| R55          | R      | Bala | 1992  | BAL1, BAL2, MK1   | 3     | Balaju           | Sand, Gravel, Clay, Bedrock, Silt, Cobbles | 72-276                             |
| R56          | R      | Bhak | 1992  | BH1, BH2, BH3, BH4, BH4a, BHD2, DW1, DW2, DW3, DW4, DW5, DW6, DW7, DW8, BKD2, BR1, TD1, CTD1, BHD1, BHD3      | 20    | Bhaktapur        | Sand, Clay, Gravel, Silt, MG, Cobbles      | 10-313                             |
| R57          | R      | Goka | 1992  | GB1, GB2, GB3, GB4, LSB1.1, LSB5.1, LSB1, LSB2, LSB3, LSB4, LSB5  | 11    | Gokarna          | Sand, Clay, MG, Silt                       | 10-81                              |

*Table 20 – Database source information (continued)*

| Reference ID | Source | Code | Year | ID's  | Count | Project location | General ground conditions                               | Final depth range (m bgl) *unknown |
|--------------|--------|------|------|---|-------|------------------|---|------------------------------------|
| R58          | R      | JICA | 1990 | B1, B2, B3, B4, B5, B6, B7, B8, B9, B10, B11, B12, B13, B14, B15, B16, B17, B18, B19, B20, B22, B23, B24, B25, BB1, BB2, BB3, BB4, BB5, BB6, BB7, BB8, DK1, DK2, DK3, DK4, DK5, DK6, DK7, DK8, DK9, GK1, GK2, GK3, GK4, GK5, GB1, GB2, GB3, GB4, GB5, GB6, GB7, GB8, GB9, GB10, P01, P02, P03a, P03b, P04, P05, P07, P08, P09, P13, P14b, P16, P17, P18, P18e, P19, P20, P22b, P23, P24, P25, P26, P27, P29, P31b, P32, P35, P36, P37, DMG1, DMG2, DMG3, DMG4, DMG5, DMG6, DMG7, DMG8, DMG9, DMG10, DMG11, DMG12, DMG13, DMG14, MH1, MH2, MH3, MH4, MH5, MH6, MH7, WHO1, WHO2, WHO2A, WHO3, WHO3A, WHO5, WHO5A, WHO6, WHO7, WHO7A, WHO8, WHO9, OW3, OW4, OW7, OW8, OW9, OW10, JP1, JW1, JW2, JW3, JW4 | 129   | Multiple         | MG, Sand, Clay, Gravel, Bedrock, Silt, Cobbles, Unknown | 10-570                             |
| R59          | R      | JICA | 2002 | BH1, BH2, BH3, BH4, BH5   | 5     | Multiple         | MG, Sand, Silt, Gravel                                  | 30                                 |
| R60          | R      | JICA | 2014 | TA1, TB1, TC1, TD1, TE1   | 5     | Multiple         | MG, Silt, Gravel, Clay, Sand, Bedrock                   | 15-31                              |
| R61          | R      | JRAP | 2016 | BH1, BH2, BH3, BH4, BH5   | 5     | Multiple         | MG, Sand, Gravel, Clay                                  | 15                                 |
| R62          | R      | Kath | 1000 | GAE1, KM1, SRTH1, THD3, Sak1, PH3, NAIK1, NAIK2, NA14, NA02, NI01   | 11    | Kathmandu        | Sand, Clay, MG, Gravel, Cobbles, Bedrock, Silt          | 160-300                            |
| R63          | R      | Lali | 1000 | LD1, LD2  | 2     | Lalitpur         | MG, Clay, Sand  | 220                                |

*Table 20 – Database source information (continued)*

| Reference ID | Source | Code | Year | ID's   | Count | Project location | General ground conditions                               | Final depth range (m bgl) *unknown |
|--------------|--------|------|------|--|-------|------------------|---|------------------------------------|
| R64          | R      | Pasu | 1000 | PAS1, PAS2, PAS3, PAS4, PAS5   | 5     | Pasupati         | MG, Sand, Clay, Unknown, Silt                           | 7-36                               |
| R65          | R      | Praa | 1000 | PR1, PR2, PR3, PR4, PR5, PR6, PR8, PR9A, PR9B, PR10, PR11, PR12, PR13, PR14, PR15, PR16, PR18, PR19, PR22, PR23, PR21, PR25, PR26, PR27, PR28, PR29, PR30, PR31, PR32, PR33, PR34, PR35, PR36  | 33    | Multiple         | Clay, Sand, MG, Silt, Gravel, Bedrock, Cobbles, Unknown | 74-305                             |
| R66          | R      | Unkn | 1000 | SPT01, SPT02, SPT03, SPT04, SPT05, SPT06, SPT07, SPT08, SPT09, SPT10, SPT11, SPT12, SPT13, SPT14, SPT15, SPT16, SPT17, SPT18, SPT19, SPT20, SPT21, SPT22, SPT23, SPT24, SPT25, SPT26, SPT27, SPT28, SPT29, SPT30, SPT31, SPT32, SPT33, SPT34, SPT35, SPT36, SPT37, SPT38, SPT39, SPT40, SPT41, SPT42, SPT43, SPT44, SPT45              | 45    | Unknown          | Unknown   | 1-6                                |
| R67          | RES    | Daha | 2002 | BH1, BH2, BH3, BH4, BH5  | 5     | Multiple         | MG, Clay, Silt, Sand                                    | 20                                 |
| R68          | RES    | Kate | 1996 | LOC1, LOC2, LOC3, LOC4, LOC5, LOC6, LOC7, LOC8, LOC9, LOC10, LOC11, LOC12, LOC13, LOC14, LOC15, LOC16, LOC17, LOC18, LOC19, LOC20, LOC21, LOC22, LOC23, LOC24, LOC25, LOC26, LOC27, LOC28, LOC29, LOC30, LOC31, LOC32, LOC33, LOC34, LOC35, LOC36, LOC37, LOC38, LOC39, LOC40, LOC41, LOC42, LOC43, LOC44, LOC45, LOC46, LOC47, LOC48, | 58    | Multiple         | Silt, Sand  | *                                  |

*Table 20 – Database source information (continued)*

| Reference ID | Source | Code | Year | ID's  | Count | Project location | General ground conditions                            | Final depth range (m bgl) *unknown |
|--------------|--------|------|------|---|-------|------------------|--|------------------------------------|
|              |        |      |      | LOC49, LOC50, LOC51, LOC52, LOC53, T1, T2, R1, R2, R3 |       |                  |  |                                    |
| R69          |        | Pagl | 2018 | BH1   | 1     | Pulchowk         | Sand, Silt, Gravel, Clay, Bedrock                    | 16                                 |
| R70          |        | Safe | 2018 | BH6, BH7  | 2     | Multiple         | MG, Unknown, Sand, Silt, Clay, Gravel, Peat, Bedrock | 30-285                             |
| R71          |        | Saka | 2001 | BH1, BH2  | 3     | Multiple         | MG, Clay, Sand, Silt, Gravel, Bedrock                | 20-30                              |
| R72          |        | Pokh | 2006 | P1, P2, P3  | 2     | Multiple         | MG, Sand, Clay, Silt                                 | 45-280                             |

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### ***Further information for Piya (2004) records***

The following source entries were informed from Piya (2004) and the information was obtained from two excel sheets made available to the SAFER project (Asimaki, 2018 personal communication). The sources have been referenced against information available in Piya (2004), however the original documents were not obtained.

***Table 21 – Source information informed from Piya (2004)***

| Source reference | Organisation         | Year      | BH ID's   |
|------------------|----------------------|-----------|---|
| R58              | GSI                  | 1960      | B wells: B01 – B25 (excluding B24) <sup>(1)</sup>   |
| R58              | WHO/UNDP/<br>BP      | 1973      | WHO wells: WHO1, WHO 2, WHO 2A, WHO 3, WHO 3A, WHO 5, WHO 5A, WHO 6, WHO 7, WHO 7A, WHO 8, WHO 9 <sup>(1)</sup> ; OW wells OW 3,4,7,8,9,10 <sup>(1)</sup> |
| R58              | JICA                 | 1990      | JW1 – JW4<br>GB1 – 10   |
| R58              | NWSC/CES             | 1992      | P wells: P01 – 37 (including P03a & b, P18e; excluding P03, P06, P10, P11, P12, P15, P21, P28, P30, P33, P34) <sup>(1)</sup>                              |
| R55              | NWSC                 | Post 1992 | Balaju wells: BAL 1, MK 1, BAL 2  |
| R58              |                      |           | Bansbari wells: BB1 – BB8 <sup>(1)</sup>  |
| R56              |                      |           | Bhaktapur wells: BH 1 – 4 <sup>(1)</sup> , BH 4(a), BHD 2, DW 1, DW 2, DW 3, DW 4, DW 5, DW 6, DW 7, DW 8, BKD 2, BR 1, TD 1, CTD 1, BHD 1, BHD 3.        |
| R58              |                      |           | Dhobikhola wells: DK 1 – DK9 <sup>(1)</sup>   |
| R57              |                      |           | Gokarna wells: GK1 – GK5 <sup>(1)</sup> , GB1 – GB4, LS B1 – B5 (Inc. B1' & B5')  |
| R58              |                      |           | Manohara wells: MH1 – MH7 <sup>(1)</sup>  |
| R65              |                      |           | PR wells: PR01 – PR36 (including PR9B; excluding PR7, PR17, PR20, PR24)   |
| R64              | Unknown Organisation | Unk       | Pasupati wells: PAS 1 – 5   |
| R62              |                      |           | Kathmandu wells: GAE 1, KM 1, SRTH 1, THD 3, SaK-1, PH 3, NAIK 1 <sup>(1)</sup> , NAIK 2 <sup>(1)</sup> , JP 1 <sup>(1)</sup> , NA 14, NA 02, NI 01.      |
| R63              |                      |           | Lalitpur wells: LD 1, LD 2  |
| R66              |                      |           | SPT01-45  |
| R58              | DMG/SC               | 1996      | DMG1 – DMG14 <sup>(1)</sup>   |
| R54              | AGSO/DOI             | 1997      | AG1 – AG75 (only AG68)  |

*Abbreviations: Japan International Co-operation Agency (JICA), Department of Mines and Geology (DMG), United Nations Development Program (UNDP), His Majesty's Government of Nepal (HMG), United Nations Centre for Human Settlements (Habitat) (UNCHS), World Health organization (WHO), United Nations Nepal Information Platform (UNNIP), Ministry of Home Affairs, Government of Nepal (MoHA), Ministry of Housing and Physical Planning, Government of Nepal (MoHPP), Geological Survey of India (GSI), Binnie and Partners (BP) (1973), Silt Consult (SC); Consulting Engineers Salzgitter (CES), Nepal Water and Sewerage Corporation (NWSC), Department of Irrigation (DOI).*

- (1) Representation of logs also available in Japan International Cooperation Agency (JICA) (1990). Groundwater Management Project in Kathmandu Valley. Japan International Co-operation Agency. Data Book.

## Appendix II: List of resources

### LIST OF RESOURCES PROVIDED WITH THE DATABASE

| File  | Description  |
|---|--|
| <b>Spreadsheets &amp; comma delimited files</b>   |  |
| SAFER-GEO-591.xlsx  | Main database excel sheet which contains the originally sourced data   |
| LOCA.csv, GEOL.csv, DETL.csv, WSTG.csv, ISPT.csv, TIME.csv, VELO.csv, LNMC.csv, LLPL.csv, GRAG.csv, LDEN.csv, LPDN.csv, TRIG.csv, SHBG.csv, CONS.csv. | Break down of each database table as a comma delimited file.   |
| LOCA_GEOL_ISPT.xlsx   | Combined database tables to enable plotting of ISPT by geology type.   |
| LOCA_GEOL_VELO.xlsx   | Combined database tables to enable plotting of velocity measurements by geology type.  |
| SPT_VELO.xlsx   | Combined database tables to enable plotting of velocity measurements against SPT-N value.<br>The average SPT-N value for each geophysical layer is provided. |
| TEST.xlsx   | Combined selected geotechnical tests.  |
| LOCA_GEOL_TEST.xlsx   | Selected geotechnical testing with associated location, borehole geology and elevation values.   |

# Appendix III: Geology codes

**Table 22 Abbreviations GEOL\_LEG**

| Code | Description                               |  |  |
|------|---|--|--|
| 0    | Unknown                                   |  |  |
| 101  | TOPSOIL                                   |  |  |
| 102  | MADE GROUND                               |  |  |
| 201  | CLAY                                      |  |  |
| 202  | Silty CLAY                                |  |  |
| 203  | Sandy CLAY                                |  |  |
| 204  | Gravelly CLAY                             |  |  |
| 205  | Cobbly CLAY                               |  |  |
| 206  | Bouldery CLAY                             |  |  |
| 207  | Silty sandy CLAY                          |  |  |
| 208  | Silty gravelly CLAY                       |  |  |
| 209  | Silty cobbly CLAY                         |  |  |
| 210  | Silty bouldery CLAY                       |  |  |
| 211  | Silty sandy gravelly CLAY                 |  |  |
| 212  | Silty sandy cobbly CLAY                   |  |  |
| 213  | Silty sandy bouldery CLAY                 |  |  |
| 214  | Silty sandy gravelly cobbly CLAY          |  |  |
| 215  | Silty sandy gravelly bouldery CLAY        |  |  |
| 216  | Silty sandy gravelly cobbly bouldery CLAY |  |  |
| 217  | Silty sandy organic CLAY                  |  |  |
| 218  | Silty sandy gravelly organic CLAY         |  |  |
| 219  | Silty organic CLAY                        |  |  |
| 220  | Sandy gravelly CLAY                       |  |  |
| 222  | Sandy cobbly CLAY                         |  |  |
| 223  | Sandy bouldery CLAY                       |  |  |
| 224  | Sandy gravelly cobbly CLAY                |  |  |
| 225  | Sandy gravelly bouldery CLAY              |  |  |
| 226  | Sandy gravelly cobbly bouldery CLAY       |  |  |
| 227  | Sandy organic CLAY                        |  |  |
| 228  | Sandy gravelly organic CLAY               |  |  |
| 229  | Organic CLAY                              |  |  |
| 230  | Gravelly cobbly CLAY                      |  |  |
| 231  | Silty gravelly cobbly CLAY                |  |  |
| 301  | SILT                                      |  |  |
| 302  | Clay/Silt                                 |  |  |
| 303  | Sandy SILT                                |  |  |
| 304  | Gravelly SILT                             |  |  |
| 305  | Organic SILT                              |  |  |
| 309  | Clayey sandy SILT                         |  |  |
| 310  | Sandy gravelly SILT                       |  |  |
| 312  | Clayey sandy gravelly SILT                |  |  |
| 314  | Clayey sandy gravelly organic cobbly SILT |  |  |
| 316  | Sandy cobbly SILT                         |  |  |
| 317  | Sandy bouldery SILT                       |  |  |
| 318  | Sandy organic SILT                        |  |  |
| 319  | Sandy gravelly organic SILT               |  |  |
| 320  | Sandy gravelly cobbly SILT                |  |  |
| 321  | Sandy gravelly organic cobbly SILT        |  |  |
| 322  | Gravelly cobbly SILT                      |  |  |
| 323  | Gravelly bouldery SILT                    |  |  |
| 324  | Gravelly organic SILT                     |  |  |
| 325  | Gravelly organic cobbly SILT              |  |  |
| 326  | Cobbly SILT                               |  |  |
| 327  | Cobbly bouldery SILT                      |  |  |
| 328  | Organic cobbly SILT                       |  |  |
| 331  | Bouldery SILT                             |  |  |
| 332  | Sandy gravelly clayey cobbly SILT         |  |  |
| 401  | SAND                                      |  |  |
| 402  | Clayey SAND                               |  |  |
| 403  | Silty SAND                                |  |  |
| 404  | Gravelly SAND                             |  |  |
| 405  | Cobbly SAND                               |  |  |
| 406  | Bouldery SAND                             |  |  |
| 410  | Clayey gravelly SAND                      |  |  |
| 411  | Clayey gravelly cobbly SAND               |  |  |
| 412  | Silty gravelly SAND                       |  |  |
| 413  | Silty gravelly cobbly SAND                |  |  |
| 414  | Silty gravelly cobbly bouldery SAND       |  |  |
| 415  | Gravelly cobbly SAND                      |  |  |
| 416  | Gravelly cobbly bouldery SAND             |  |  |
| 417  | Gravelly bouldery SAND                    |  |  |
| 418  | Cobbly bouldery SAND                      |  |  |
| 419  | Silty cobbly SAND                         |  |  |
| 430  | SAND and GRAVEL                           |  |  |
| 431  | Organic SAND                              |  |  |
| 433  | Silty organic SAND                        |  |  |
| 434  | Gravelly organic SAND                     |  |  |
| 435  | Cobbly organic SAND                       |  |  |
| 436  | Bouldery organic SAND                     |  |  |
| 501  | GRAVEL                                    |  |  |
| 502  | Clayey GRAVEL                             |  |  |
| 503  | Silty GRAVEL                              |  |  |
| 504  | Sandy GRAVEL                              |  |  |
| 505  | Organic GRAVEL                            |  |  |
| 506  | Cobbly GRAVEL                             |  |  |
| 507  | Bouldery GRAVEL                           |  |  |
| 509  | Clayey sandy GRAVEL                       |  |  |
| 510  | Clayey cobbly GRAVEL                      |  |  |
| 511  | Clayey bouldery GRAVEL                    |  |  |
| 512  | Clayey organic GRAVEL                     |  |  |

|     |                              |     |                                      |
|-----|------------------------------|-----|--------------------------------------|
| 513 | Clayey sandy cobbly GRAVEL   | 717 | Silty sandy organic COBBLES          |
| 517 | Clayey sandy organic GRAVEL  | 718 | Silty sandy gravelly organic COBBLES |
| 520 | Silty sandy GRAVEL           | 719 | Sandy gravelly COBBLES               |
| 521 | Silty cobbly GRAVEL          | 720 | Sandy organic COBBLES                |
| 522 | Silty bouldery GRAVEL        | 721 | Gravelly organic COBBLES             |
| 523 | Silty organic GRAVEL         | 725 | COBBLES and BOULDERS                 |
| 524 | Silty organic sandy GRAVEL   | 730 | BOULDERS                             |
| 525 | Sandy cobbly GRAVEL          | 731 | Gravelly cobbly BOULDERS             |
| 526 | Sandy bouldery GRAVEL        | 801 | MUDSTONE                             |
| 527 | Sandy organic GRAVEL         | 802 | SILTSTONE                            |
| 528 | Silty sandy cobbly GRAVEL    | 803 | SANDSTONE                            |
| 601 | PEAT                         | 804 | LIMESTONE                            |
| 602 | Clayey PEAT                  | 806 | COAL (lignite)                       |
| 603 | Silty PEAT                   | 812 | Fine grained METAMORPHIC             |
| 604 | Sandy PEAT                   | 813 | Medium grained METAMORPHIC           |
| 605 | Gravelly PEAT                | 814 | Coarse grained METAMORPHIC           |
| 606 | Cobbly PEAT                  |     |                                      |
| 608 | Clayey sandy PEAT            |     |                                      |
| 609 | Clayey gravelly PEAT         |     |                                      |
| 612 | Silty sandy PEAT             |     |                                      |
| 613 | Silty sandy gravelly PEAT    |     |                                      |
| 614 | Sandy gravelly PEAT          |     |                                      |
| 701 | COBBLES                      |     |                                      |
| 702 | Clayey COBBLES               |     |                                      |
| 703 | Silty COBBLES                |     |                                      |
| 704 | Sandy COBBLES                |     |                                      |
| 705 | Gravelly COBBLES             |     |                                      |
| 706 | Organic COBBLES              |     |                                      |
| 708 | Clayey sandy COBBLES         |     |                                      |
| 709 | Clayey gravelly COBBLES      |     |                                      |
| 713 | Silty sandy COBBLES          |     |                                      |
| 714 | Silty gravelly COBBLES       |     |                                      |
| 715 | Silty organic COBBLES        |     |                                      |
| 716 | Silty gravelly sandy COBBLES |     |                                      |

## Appendix IV: Database Overview

*Table 23 – Database overview*

| Source | Code | Year | BH_ID | Log quality |           | Easting    | Northing | Elevation<br>m (MSL) | Final Depth<br>(m bgl) |           | Location | Material types                  |
|--------|------|------|-------|-------------|-----------|------------|----------|----------------------|------------------------|-----------|----------|---------------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE |            |          |                      | LOCA_GL                | LOCA_FDEP | LOCA_Rem |                                 |
| R      | JICA | 1990 | B1    | 2           | 335110.94 | 3059787.08 | 1353     | 457.2                | Harisiddhi             |           |          | MG, Sand, Clay                  |
| R      | JICA | 1990 | B2    | 2           | 336761.96 | 3070477.14 | 1340     | 79.25                | Bansbari               |           |          | MG, Sand, Clay, Gravel, Bedrock |
| R      | JICA | 1990 | B3    | 2           | 343131.01 | 3070089.05 | 1346     | 241.14               | Nayapati               |           |          | MG, Clay, Sand, Gravel          |
| R      | JICA | 1990 | B4    | 2           | 340314.96 | 3067783.02 | 1318     | 305.1                | Gokarna                |           |          | Gravel, Clay, Sand              |
| R      | JICA | 1990 | B5    | 2           | 337350.96 | 3063388.02 | 1318     | 305.1                | Koteshwar              |           |          | Clay, Sand                      |
| R      | JICA | 1990 | B6    | 2           | 347051.02 | 3063264.21 | 1365     | 277.67               | Bhadgaon               |           |          | MG, Sand, Clay                  |
| R      | JICA | 1990 | B7    | 2           | 333665.97 | 3072182.12 | 1340     | 201.61               | Phutung                |           |          | MG, Sand, Clay                  |
| R      | JICA | 1990 | B8    | 2           | 333822.97 | 3057742.12 | 1362     | 290.78               | Sunakothi              |           |          | MG, Clay, Sand                  |
| R      | JICA | 1990 | B9    | 2           | 339377.98 | 3058646.01 | 1332     | 271.57               | Lubhu                  |           |          | MG, Gravel, Clay                |
| R      | JICA | 1990 | B10   | 2           | 331703.94 | 3064485.11 | 1304     | 275                  | Rabi Bhawan            |           |          | Sand, Silt, Gravel, Bedrock     |
| R      | JICA | 1990 | B11   | 2           | 339612.00 | 3067818.15 | 1350     | 240                  | Chabahil               |           |          | Clay, Sand                      |
| R      | JICA | 1990 | B12   | 2           | 334856.98 | 3068285.07 | 1324     | 239                  | Paniphokari            |           |          | Clay, Sand                      |
| R      | JICA | 1990 | B13   | 2           | 332423.92 | 3065404.19 | 1298     | 239                  | Tahachal               |           |          | MG, Clay, Gravel, Sand, Bedrock |
| R      | JICA | 1990 | B14   | 2           | 331410.92 | 3065718.15 | 1310     | 319                  | Tahachal               |           |          | MG, Sand, Clay, Bedrock         |
| R      | JICA | 1990 | B15   | 2           | 331760.94 | 3066153.20 | 1310     | 229                  | Swayambunath           |           |          | Clay, Sand, Bedrock             |
| R      | JICA | 1990 | B16   | 2           | 333083.95 | 3065848.12 | 1300     | 376                  | Lagan Tole             |           |          | Sand, Clay                      |
| R      | JICA | 1990 | B17   | 2           | 334892.93 | 3064898.02 | 1300     | 273.31               | Singha Durbar          |           |          | MG, Clay, Sand, Gravel, Bedrock |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                       | Material types                     |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|--------------------------------|------------------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                                | GEOL_LEG                           |
| R      | JICA | 1990 | B18   | 2           |           | 333691.92 | 3065628.10 | 1300                 | 274.31                 | Bir Hospital                   | Sand, Clay                         |
| R      | JICA | 1990 | B19   | 2           |           | 336682.96 | 3066125.08 | 1315                 | 113.38                 | Gaushala                       | MG, Sand, Clay, Cobbles            |
| R      | JICA | 1990 | B20   | 2           |           | 342864.02 | 3061376.98 | 1335                 | 160                    | Katunje                        | Clay, Sand, Silt, Cobbles, Bedrock |
| R      | JICA | 1990 | B22   | 2           |           | 339439.97 | 3063359.18 | 1322                 | 278.28                 | Sanu Thimi                     | MG, Sand, Gravel, Clay, Cobbles    |
| R      | JICA | 1990 | B23   | 2           |           | 334863.99 | 3061317.02 | 1320                 | 304.19                 | Patan Industrial Estate, Patan | MG, Sand, Clay                     |
| R      | JICA | 1990 | B24   | 2           |           | 332862.95 | 3063058.18 | 1295                 | 60.04                  | Shanta Bhawan, Patan           | Clay, Cobbles, Bedrock             |
| R      | JICA | 1990 | B25   | 2           |           | 332862.95 | 3063058.11 | 1310                 | 123                    | Surendra Bhavan, Patan         | Clay, Gravel, Bedrock              |
| R      | Bala | 1992 | BAL1  | 2           |           | 333101.97 | 3069081.20 | 1316                 | 276.9                  | Balaju                         | Sand, Gravel, Clay                 |
| R      | Bala | 1992 | BAL2  | 2           |           | 333122.24 | 3069387.24 | 1316                 | 72.18                  | Balaju mahadev Khola           | Sand, Clay, Bedrock                |
| R      | Bala | 1992 | MK1   | 2           |           | 332735.97 | 3069614.19 | 1270                 | 200                    | Balaju                         | Silt, Sand, Clay, Cobbles          |
| R      | JICA | 1990 | BB1   | 2           |           | 336644.00 | 3070015.22 | 1325                 | 277.72                 | Bansbari                       | Sand, Clay, Cobbles, Bedrock       |
| R      | JICA | 1990 | BB2   | 2           |           | 336934.01 | 3070642.22 | 1353                 | 225.32                 | Gulfutar                       | Clay, Sand                         |
| R      | JICA | 1990 | BB3   | 2           |           | 335274.99 | 3071226.25 | 1315                 | 217.33                 | Dhapasi                        | Sand, Clay, Gravel                 |
| R      | JICA | 1990 | BB4   | 2           |           | 334983.93 | 3070841.05 | 1312                 | 254.09                 | Dhapasi                        | Clay, Sand, Gravel                 |
| R      | JICA | 1990 | BB5   | 2           |           | 334720.96 | 3070036.11 | 1310                 | 283.79                 | Dhapasi                        | Clay, Gravel, Sand                 |
| R      | JICA | 1990 | BB6   | 2           |           | 334965.96 | 3070355.17 | 1311                 | 198.42                 | Dhapasi                        | Sand, Gravel, Clay                 |
| R      | JICA | 1990 | BB7   | 2           |           | 334364.98 | 3069290.19 | 1306                 | 259.2                  | Gongabu                        | Clay, Sand, Gravel                 |
| R      | JICA | 1990 | BB8   | 2           |           | 334511.98 | 3069525.14 | 1314                 | 221.3                  | Pragati Nagar, Gongabu         | Sand, Clay                         |
| R      | JICA | 1990 | DK1   | 2           |           | 337724.98 | 3067522.10 | 1337                 | 92.91                  |                                | Sand, Clay                         |
| R      | JICA | 1990 | DK2   | 2           |           | 338812.99 | 3068685.20 | 1340                 | 63.56                  |                                | Sand                               |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location | Material types              |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|----------|-----------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE |           |            |                      |                        |          | GEOL_LEG                    |
| R      | JICA | 1990 | DK3   | 2           |           | 338786.97 | 3068397.06 | 1327                 | 201.5                  |          | Sand, Gravel, Clay, Bedrock |
| R      | JICA | 1990 | DK4   | 2           |           | 338663.99 | 3068065.02 | 1332                 | 50.91                  |          | Sand, Clay                  |
| R      | JICA | 1990 | DK5   | 2           |           | 337961.98 | 3067598.08 | 1338                 | 150                    |          | Clay, Gravel, Sand          |
| R      | JICA | 1990 | DK6   | 2           |           | 337813.95 | 3068380.02 | 1313                 | 110.68                 |          | Sand, Clay, Bedrock         |
| R      | JICA | 1990 | DK7   | 2           |           | 337947.97 | 3067785.19 | 1340                 | 120.73                 |          | Sand, Clay                  |
| R      | JICA | 1990 | DK8   | 2           |           | 337593.96 | 3068648.16 | 1320                 | 33.85                  |          | Clay, Sand, Gravel          |
| R      | JICA | 1990 | DK9   | 2           |           | 338223.99 | 3068023.24 | 1335                 | 82.48                  |          | Gravel, Clay, Sand          |
| R      | JICA | 1990 | GK1   | 2           |           | 343615.02 | 3069901.24 | 1345                 | 288                    |          | MG, Sand                    |
| R      | JICA | 1990 | GK2   | 2           |           | 342606.02 | 3069668.07 | 1340                 | 151.3                  |          | Sand, Gravel                |
| R      | JICA | 1990 | GK3   | 2           |           | 342955.01 | 3069841.08 | 1346                 | 244                    |          | Sand, Gravel, Clay          |
| R      | JICA | 1990 | GK4   | 2           |           | 343253.01 | 3069958.07 | 1348                 | 253.6                  |          | Sand, Gravel, Clay          |
| R      | JICA | 1990 | GK5   | 2           |           | 343615.99 | 3070297.24 | 1358                 | 164.7                  |          | Sand, Clay, Gravel, Bedrock |
| R      | JICA | 1990 | GB1   | 2           |           | 333447.44 | 3052450.38 | 1370                 | 13.5                   |          | Clay, Bedrock               |
| R      | JICA | 1990 | GB2   | 2           |           | 333398.75 | 3052558.33 | 1455                 | 16.5                   |          | Bedrock                     |
| R      | JICA | 1990 | GB3   | 2           |           | 334166.81 | 3068412.44 | 1299                 | 10                     |          | Clay, Sand                  |
| R      | JICA | 1990 | GB4   | 2           |           | 334932.58 | 3068450.07 | 1298                 | 20                     |          | Unknown, Sand, Clay         |
| R      | JICA | 1990 | GB5   | 2           |           | 337985.57 | 3067019.86 | 1302                 | 10                     |          | Clay, Sand                  |
| R      | JICA | 1990 | GB6   | 2           |           | 338367.44 | 3067007.62 | 1302                 | 20                     |          | Clay, Sand                  |
| R      | JICA | 1990 | GB7   | 2           |           | 342056.08 | 3066871.02 | 1318                 | 10                     |          | Sand                        |
| R      | JICA | 1990 | GB8   | 2           |           | 342178.34 | 3066819.16 | 1318                 | 20                     |          | Sand                        |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID  | Log quality |           | Easting   | Northing   | Elevation m (MSL) | Final Depth (m bgl) | Location                                   | Material types         |
|--------|------|------|--------|-------------|-----------|-----------|------------|-------------------|---------------------|--|------------------------|
|        |      |      |        | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP         | LOCA_Rem            |  | GEOL_LEG               |
| R      | JICA | 1990 | GB9    | 2           |           | 329186.60 | 3061377.39 | 1345              | 12                  |  | Clay, Bedrock          |
| R      | JICA | 1990 | GB10   | 2           |           | 330234.78 | 3061377.39 | 1315              | 18                  |  | MG, Bedrock            |
| R      | Goka | 1992 | GB1    | 2           |           | 340899.98 | 3067900.02 | 1360              | 81                  |  | Sand, Clay             |
| R      | Goka | 1992 | GB2    | 2           |           | 341692.01 | 3068350.01 | 1380              | 80                  |  | Sand, Clay             |
| R      | Goka | 1992 | GB3    | 2           |           | 341195.97 | 3067724.05 | 1340              | 81                  |  | MG, Sand, Clay         |
| R      | Goka | 1992 | GB4    | 2           |           | 341772.02 | 3067922.02 | 1338              | 80                  |  | MG, Sand, Clay         |
| R      | Goka | 1992 | LSB1.1 | 2           |           | 341142.96 | 3067293.05 | 1335              | 15                  | Gokarna landfill                           | Silt, Sand             |
| R      | Goka | 1992 | LSB5.1 | 2           |           | 341246.99 | 3067294.02 | 1340              | 20                  | Gokarna landfill                           | MG, Sand               |
| R      | Goka | 1992 | LSB1   | 2           |           | 341136.98 | 3067278.20 | 1325              | 30                  | Gokarna landfill                           | Sand                   |
| R      | Goka | 1992 | LSB2   | 2           |           | 341033.98 | 3067322.21 | 1323              | 20                  | Gokarna landfill                           | Sand                   |
| R      | Goka | 1992 | LSB3   | 2           |           | 341395.00 | 3066773.12 | 1333              | 10                  | Gokarna landfill                           | MG, Sand               |
| R      | Goka | 1992 | LSB4   | 2           |           | 341479.99 | 3066939.06 | 1330              | 10                  | Gokarna landfill                           | Sand                   |
| R      | Goka | 1992 | LSB5   | 2           |           | 341240.00 | 3067507.21 | 1329              | 10                  | Gokarna landfill                           | MG, Sand               |
| R      | JICA | 2002 | BH1    | 1           |           | 333244.92 | 3065514.72 | 1309              | 30                  | New Road, Fire brigade Compound            | MG, Sand, Silt         |
| R      | JICA | 2002 | BH2    | 1           |           | 334810.33 | 3065194.56 | 1299              | 30                  | Northern Periphery Road, Singh Durbar      | MG, Sand, Gravel, Silt |
| R      | JICA | 2002 | BH3    | 1           |           | 333496.04 | 3061902.12 | 1310              | 30                  | Apartment Hotel at Jawalakhel, Lalitpur    | MG, Sand, Silt         |
| R      | JICA | 2002 | BH4    | 1           |           | 341119.94 | 3061946.69 | 1300              | 30                  | Near Altech (P) Ltd, Arniko Highway, Thimi | MG, Sand, Gravel, Silt |
| R      | JICA | 2002 | BH5    | 1           |           | 345381.76 | 3062134.03 | 1320              | 30                  | Durbar Square, Bhaktapur                   | MG, Silt, Sand         |
| R      | JICA | 1990 | P01    | 2           |           | 332494.95 | 3068873.14 | 1315              | 72.18               | Balaju Industrial District                 | Sand, Clay, Bedrock    |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                                    | Material types              |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|---|-----------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |   | GEOL_LEG                    |
| R      | JICA | 1990 | P02   | 2           |           | 332447.94 | 3068181.26 | 1315                 | 276.9                  | Balaju Industrial District                  | MG, Sand, Clay, Gravel      |
| R      | JICA | 1990 | P03a  | 2           |           | 332543.93 | 3068544.22 | 1315                 | 300                    | Bottlers Nepal, Balaju                      | MG, Sand, Clay, Bedrock     |
| R      | JICA | 1990 | P03b  | 2           |           | 332541.96 | 3068561.02 | 1315                 | 48                     | Bottlers Nepal, Balaju                      | MG, Sand, Clay              |
| R      | JICA | 1990 | P04   | 2           |           | 332448.95 | 3068501.13 | 1316                 | 140                    | Kathmandu Hatchery                          | Clay, Sand, Gravel, Bedrock |
| R      | JICA | 1990 | P05   | 2           |           | 335794.95 | 3069156.07 | 1342                 | 150                    | Maharajgunj                                 | Sand, Clay                  |
| R      | JICA | 1990 | P07   | 2           |           | 335144.93 | 3068625.09 | 1330                 | 250                    | Hotel Kathmandu                             | Sand, Clay                  |
| R      | JICA | 1990 | P08   | 2           |           | 334090.99 | 3067358.11 | 1318                 | 219                    | British Embassy                             | Clay, Sand                  |
| R      | JICA | 1990 | P09   | 2           |           | 333474.97 | 3067140.09 | 1316                 | 260                    | Sainik Niwas Indian Embassy                 | Clay, Sand, Gravel          |
| R      | JICA | 1990 | P13   | 2           |           | 333966.98 | 3066409.01 | 1310                 | 293                    | Hotel Annapurna                             | MG, Sand, Clay, Gravel      |
| R      | JICA | 1990 | P14b  | 2           |           | 334330.57 | 3066767.45 | 1310                 | 292.5                  | Hotel Yak and Yeti                          | MG, Sand, Clay, Bedrock     |
| R      | JICA | 1990 | P16   | 2           |           | 332248.62 | 3065302.95 | 1303                 | 176                    | Japanese Ambassador's Residence, Tahachal   | Clay, Sand, Gravel          |
| R      | JICA | 1990 | P17   | 2           |           | 331399.94 | 3065537.14 | 1300                 | 298                    | Hotel Soaltee Oberoi (No.5)                 | Clay, Sand, Gravel          |
| R      | JICA | 1990 | P18   | 2           |           | 331422.96 | 3065504.08 | 1298                 | 305                    | Hotel Soaltee Oberoi (No.4)                 | Clay, Gravel, Silt, Sand    |
| R      | JICA | 1990 | P18e  | 2           |           | 331546.93 | 3065279.03 | 1298                 | 312                    | Casino Nepal, Soaltee                       | MG, Clay, Sand              |
| R      | JICA | 1990 | P19   | 2           |           | 341421.10 | 3062227.88 | 1300                 | 250                    | HEM Trading                                 | Clay, Sand, Gravel          |
| R      | JICA | 1990 | P20   | 2           |           | 326873.92 | 3063798.02 | 1362                 | 280                    | Nirvana Vanaspatti, Satungal, Kathmandu     | Clay, Sand, Silt, Gravel    |
| R      | JICA | 1990 | P22b  | 2           |           | 335037.95 | 3063984.12 | 1290                 | 280                    | Royal Drug research, Laboratory, Thapathali | MG, Clay, Sand              |
| R      | JICA | 1990 | P23   | 2           |           | 335612.98 | 3063954.12 | 1300                 | 268.2                  | Everest Hotel                               | Sand, Clay                  |
| R      | JICA | 1990 | P24   | 2           |           | 337676.00 | 3065822.11 | 1320                 | 35                     | Tribhuvan Airport                           | Silt, Sand                  |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                                   | Material types                  |
|--------|------|------|-------|-------------|-----------|------------|----------------------|------------------------|--|---------------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN  | LOCA_GL              | LOCA_FDEP              | LOCA_Rem                                   | GEOL_LEG                        |
| R      | JICA | 1990 | P25   | 2           | 338512.00 | 3063880.06 | 1301                 | 256                    | Pepsi (1) Factory Manohara                 | MG, Sand, Silt, Clay, Gravel    |
| R      | JICA | 1990 | P26   | 2           | 338711.99 | 3063712.18 | 1301                 | 300                    | Pepsi (2) Factory Manohara                 | MG, Sand, Clay                  |
| R      | JICA | 1990 | P27   | 2           | 339428.99 | 3063275.19 | 1322                 | 253                    | SOS  | Clay, Gravel, Sand              |
| R      | JICA | 1990 | P29   | 2           | 334302.93 | 3063545.20 | 1285                 | 218                    | Himalaya Hotel                             | Clay, Sand                      |
| R      | JICA | 1990 | P31b  | 2           | 331562.93 | 3062402.21 | 1282                 | 300                    | Horticulture Development Project, Kirtipur | MG, Clay, Sand, Gravel, Bedrock |
| R      | JICA | 1990 | P32   | 2           | 332954.15 | 3062526.38 | 1304                 | 220                    | Pasupati Textile                           | Clay, Sand                      |
| R      | JICA | 1990 | P35   | 2           | 331564.93 | 3060431.12 | 1275                 | 153                    | Himal Cement (1) Factory, Chobhar          | Sand, Clay, Gravel              |
| R      | JICA | 1990 | P36   | 2           | 331505.91 | 3060315.03 | 1275                 | 90                     | Himal Cement (2) Factory, Chobhar          | Sand, Clay, Gravel              |
| R      | JICA | 1990 | P37   | 2           | 335261.97 | 3059597.14 | 1320                 | 370                    | Interknit Industries                       | Clay, Sand                      |
| R      | JICA | 1990 | DMG1  | 2           | 333551.94 | 3064577.12 | 1280                 | 305                    | Tripureswor                                | Sand, Clay, Gravel              |
| R      | JICA | 1990 | DMG2  | 2           | 332873.94 | 3064704.14 | 1280                 | 302                    | Deptarmant of Health, Pachali, Teku        | Clay, Sand, Gravel              |
| R      | JICA | 1990 | DMG3  | 2           | 332463.92 | 3064464.08 | 1279                 | 302                    | Teku                                       | Clay, Sand                      |
| R      | JICA | 1990 | DMG4  | 2           | 332598.94 | 3065106.14 | 1285                 | 300                    | Hyumat Tole                                | Clay, Sand                      |
| R      | JICA | 1990 | DMG5  | 2           | 332591.93 | 3065111.06 | 1285                 | 450.5                  | Hyumat Tole                                | MG, Clay, Sand, Bedrock         |
| R      | JICA | 1990 | DMG6  | 2           | 334193.30 | 3065114.58 | 1294                 | 570.13                 | Bhirkutimandub                             | Sand, Clay, Gravel, Bedrock     |
| R      | JICA | 1990 | DMG7  | 2           | 332441.93 | 3064349.10 | 1279                 | 358.8                  | Teku                                       | Sand, Clay, Bedrock             |
| R      | JICA | 1990 | DMG8  | 2           | 335472.97 | 3063127.18 | 1280                 | 455.31                 | Sankhamul                                  | MG, Sand, Clay                  |
| R      | JICA | 1990 | DMG9  | 2           | 336081.99 | 3062822.08 | 1279                 | 300                    | Koteswar                                   | Clay, Sand                      |
| R      | JICA | 1990 | DMG10 | 2           | 336990.98 | 3063457.03 | 1297                 | 300                    | Tinkune,Koteswar                           | MG, Sand, Clay                  |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID     | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                             | Material types                 |
|--------|------|------|-----------|-------------|-----------|-----------|------------|----------------------|------------------------|--------------------------------------|--------------------------------|
|        |      |      |           | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                                      | GEOL_LEG                       |
| R      | JICA | 1990 | DMG11     | 2           |           | 337639.95 | 3062433.13 | 1295                 | 305                    | Herbs production centre,<br>Manohara | Sand, Clay                     |
| R      | JICA | 1990 | DMG12     | 2           |           | 337249.00 | 3061445.04 | 1292                 | 307                    | Tikathali, Lalitpur                  | Clay, Gravel, Silt, Sand       |
| R      | JICA | 1990 | DMG13     | 2           |           | 336274.98 | 3061824.02 | 1280                 | 298                    | Balkumari, Lalitpur                  | Clay, Sand, Silt               |
| R      | JICA | 1990 | DMG14     | 2           |           | 336622.97 | 3061981.07 | 1290                 | 289                    | Imadol, Lalitpur                     | Clay, Sand                     |
| R      | JICA | 1990 | MH1       | 2           |           | 344597.03 | 3067871.18 | 1335                 | 228.15                 |                                      | Gravel, Sand, Clay,<br>Bedrock |
| R      | JICA | 1990 | MH2       | 2           |           | 342412.99 | 3066636.06 | 1340                 | 322.09                 |                                      | Sand, Gravel                   |
| R      | JICA | 1990 | MH3       | 2           |           | 341843.01 | 3066610.20 | 1337                 | 330.3                  |                                      | Sand, Gravel, Clay             |
| R      | JICA | 1990 | MH4       | 2           |           | 341495.03 | 3066422.16 | 1329                 | 260                    |                                      | Sand                           |
| R      | JICA | 1990 | MH5       | 2           |           | 341467.99 | 3066118.04 | 1321                 | 304.68                 |                                      | Sand, Clay                     |
| R      | JICA | 1990 | MH6       | 2           |           | 341756.97 | 3065726.22 | 1316                 | 305.97                 |                                      | Sand, Clay                     |
| R      | JICA | 1990 | MH7       | 2           |           | 343033.01 | 3066617.21 | 1322                 | 303.58                 |                                      | Sand, Silt                     |
| R      | JICA | 1990 | WHO1      | 2           |           | 337555.00 | 3069683.22 | 1326                 | 160.5                  |                                      | Sand, Clay, Gravel,<br>Bedrock |
| R      | JICA | 1990 | WHO2      | 2           |           | 342193.00 | 3064803.11 | 1335                 | 146                    |                                      | Silt, Sand, Clay, Gravel       |
| R      | JICA | 1990 | WHO2<br>A | 2           |           | 341802.60 | 3064314.26 | 1340                 | 109.8                  |                                      | Sand, Clay, Silt               |
| R      | JICA | 1990 | WHO3      | 2           |           | 336812.00 | 3070499.18 | 1355                 | 112.2                  |                                      | Sand, Clay, Silt, Gravel       |
| R      | JICA | 1990 | WHO3<br>A | 2           |           | 336812.00 | 3070545.18 | 1355                 | 94.5                   |                                      | Clay, Gravel, Sand, Silt       |
| R      | JICA | 1990 | WHO5      | 2           |           | 341259.99 | 3064260.11 | 1333                 | 141.9                  |                                      | Clay, Sand, Gravel             |
| R      | JICA | 1990 | WHO5<br>A | 2           |           | 341101.12 | 3063475.27 | 1332                 | 38.8                   |                                      | Clay, Sand, Silt               |
| R      | JICA | 1990 | WHO6      | 2           |           | 341305.01 | 3068592.21 | 1336                 | 129.5                  |                                      | Clay, Sand, Gravel             |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                   | Material types                           |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|----------------------------|--|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE |           |            |                      |                        |                            | GEOL_LEG                                 |
| R      | JICA | 1990 | WHO7  | 2           |           | 344408.00 | 3070439.18 | 1359                 | 166.9                  |                            | Sand, Clay                               |
| R      | JICA | 1990 | WHO7A | 2           |           | 344429.00 | 3070503.18 | 1359                 | 123.3                  |                            | Sand, Clay, Gravel                       |
| R      | JICA | 1990 | WHO8  | 2           |           | 332716.93 | 3057430.19 | 1359                 | 360                    |                            | Clay, Sand, Gravel, Bedrock              |
| R      | JICA | 1990 | WHO9  | 2           |           | 343668.00 | 3068336.10 | 1359                 | 215.6                  |                            | Clay, Sand                               |
| R      | JICA | 1990 | OW3   | 2           |           | 343172.00 | 3070022.05 | 1350                 | 184.7                  | Nayapati                   | Gravel, Sand, Clay, Silt                 |
| R      | JICA | 1990 | OW4   | 2           |           | 343802.01 | 3068226.08 | 1358                 | 239.8                  | Alapot, Bhadra Bas         | Sand, Gravel, Clay                       |
| R      | JICA | 1990 | OW7   | 2           |           | 336225.99 | 3072177.16 | 1335                 | 120.8                  | Budhanilkanth              | Sand, Clay                               |
| R      | JICA | 1990 | OW8   | 2           |           | 346227.03 | 3068770.25 | 1380                 | 126.8                  | Pasikhel                   | Sand, Clay, Gravel                       |
| R      | JICA | 1990 | OW9   | 2           |           | 344684.02 | 3069665.16 | 1370                 | 184                    | Alapot                     | Sand, Gravel, Clay                       |
| R      | JICA | 1990 | OW10  | 2           |           | 347163.02 | 3068653.18 | 1370                 | 126.8                  | Sankhu                     | Gravel, Sand, Clay                       |
| R      | Pasu | 1000 | PAS1  | 2           |           | 337805.97 | 3066282.24 | 1285                 | 7.62                   |                            | MG, Sand, Clay                           |
| R      | Pasu | 1000 | PAS2  | 2           |           | 337776.99 | 3066265.20 | 1286                 | 7.62                   |                            | MG, Sand, Clay                           |
| R      | Pasu | 1000 | PAS3  | 2           |           | 337803.95 | 3066243.04 | 1287                 | 7.62                   |                            | Clay, Sand                               |
| R      | Pasu | 1000 | PAS4  | 2           |           | 337713.21 | 3065928.78 | 1290                 | 36.5                   |                            | Unknown, Sand, Clay, Silt                |
| R      | Pasu | 1000 | PAS5  | 2           |           | 337497.00 | 3065792.22 | 1290                 | 23                     |                            | Clay, Sand                               |
| R      | Kath | 1000 | GAE1  | 2           |           | 333538.93 | 3068962.03 | 1317                 | 205                    | Gangabu, real state        | Sand, Clay                               |
| R      | Kath | 1000 | KM1   | 2           |           | 331699.98 | 3064761.22 | 1270                 | 277.8                  |                            | MG, Clay, Sand, Gravel, Cobbles, Bedrock |
| R      | Kath | 1000 | SRTH1 | 2           |           | 332948.92 | 3064595.05 | 1280                 | 300                    | Teku, Sukra Raj            | MG, Clay, Sand                           |
| R      | Kath | 1000 | THD3  | 2           |           | 327969.93 | 3063690.08 | 1355                 | 160                    |                            | Clay, Sand, Cobbles                      |
| R      | Kath | 1000 | Sak1  | 2           |           | 333597.93 | 3064476.23 | 1280                 | 275                    | Saket complex, Tripureswor | MG, Silt, Sand                           |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                    | Material types                        |
|--------|------|------|-------|-------------|-----------|------------|----------------------|------------------------|-----------------------------|---------------------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN  | LOCA_GL              | LOCA_FDEP              | LOCA_Rem                    | GEOL_LEG                              |
| R      | Kath | 1000 | PH3   | 2           | 331286.20 | 3055583.91 | 1260                 | 185.51                 | Pharping                    | Clay, Sand, Gravel, Bedrock           |
| R      | Kath | 1000 | NAIK1 | 2           | 328549.93 | 3063853.11 | 1350                 | 250                    |                             | Clay, Sand, Bedrock                   |
| R      | Kath | 1000 | NAIK2 | 2           | 328449.92 | 3063753.16 | 1340                 | 260                    | Naikap                      | Clay, Sand, Bedrock                   |
| R      | JICA | 1990 | JP1   | 2           | 339675.98 | 3067445.06 | 1322                 | 151                    |                             | Sand, Gravel, Clay, Bedrock           |
| R      | Kath | 1000 | NA14  | 2           | 337675.98 | 3065822.12 | 1320                 | 225                    |                             | MG, Sand, Clay, Bedrock               |
| R      | Kath | 1000 | NA02  | 2           | 338135.96 | 3067648.10 | 1340                 | 267                    | Taragaon hotel              | Clay, Sand                            |
| R      | Kath | 1000 | NI01  | 2           | 337149.98 | 3069056.02 | 1340                 | 200                    | Mandika Tar                 | MG, Clay, Sand                        |
| RES    | Saka | 2001 | P1    | 2           | 331737.64 | 3064444.26 | 1303                 | 280                    |                             | MG, Clay, Sand, Silt, Gravel, Bedrock |
| RES    | Saka | 2001 | P2    | 2           | 334035.63 | 3065950.52 | 1304                 | 65                     |                             | MG, Sand, Clay                        |
| RES    | Saka | 2001 | P3    | 2           | 334000.14 | 3062766.97 | 1307                 | 45                     |                             | MG, Clay, Sand                        |
| R      | Praa | 1000 | PR1   | 2           | 333616.96 | 3065037.10 | 1300                 | 300                    | Ministry of Finance         | Clay, Sand                            |
| R      | Praa | 1000 | PR2   | 2           | 334001.92 | 3065516.04 | 1305                 | 305                    | Nepal Electricity Authority | MG, Sand, Silt, Clay                  |
| R      | Praa | 1000 | PR3   | 2           | 333972.97 | 3066406.11 | 1315                 | 303                    | Hotel Annapurna             | MG, Sand, Clay                        |
| R      | Praa | 1000 | PR4   | 2           | 333669.96 | 3067059.08 | 1317                 | 300                    | Hotel Malla                 | Sand, Clay                            |
| R      | Praa | 1000 | PR5   | 2           | 334465.98 | 3067833.04 | 1319                 | 275                    | Indian Embassy              | MG, Sand, Clay                        |
| R      | Praa | 1000 | PR6   | 2           | 334611.93 | 3067471.19 | 1318                 | 218                    | Hotel Manaslu               | Sand, Clay                            |
| R      | Praa | 1000 | PR8   | 2           | 335368.98 | 3068972.18 | 1341                 | 233.6                  | Kanti Bal Hospital          | MG, Sand, Clay, Gravel                |
| R      | Praa | 1000 | PR9A  | 2           | 334897.95 | 3068673.12 | 1325                 | 195                    | Birendra Police Hospital    | Sand, Clay                            |
| R      | Praa | 1000 | PR9B  | 2           | 334897.95 | 3068673.12 | 1325                 | 216                    | Birendra Police Hospital    | Sand, Clay                            |
| R      | Praa | 1000 | PR10  | 2           | 335928.98 | 3069341.07 | 1342                 | 250                    | U.S Emb. Residence          | Silt, Gravel, Sand, Clay              |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                                  | Material types            |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|---|---------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |   | GEOL_LEG                  |
| R      | Praa | 1000 | PR11  | 2           |           | 335570.93 | 3067479.07 | 1320                 | 275                    | Chinese Embassy (Baluwatar)               | Clay, Sand                |
| R      | Praa | 1000 | PR12  | 2           |           | 334657.94 | 3066637.21 | 1315                 | 280                    | ECCO, Chinese Emb. Naxal                  | Clay, Sand                |
| R      | Praa | 1000 | PR13  | 2           |           | 332365.92 | 3065032.05 | 1288                 | 300                    | Kalimati Veg. Market                      | MG, Clay                  |
| R      | Praa | 1000 | PR14  | 2           |           | 331733.92 | 3064435.10 | 1304                 | 282.28                 | HMTTC                                     | Clay, Silt, Sand, Bedrock |
| R      | Praa | 1000 | PR15  | 2           |           | 336263.95 | 3063464.22 | 1285                 | 250                    | ITECO Nepal                               | Clay, Sand                |
| R      | Praa | 1000 | PR16  | 2           |           | 332923.98 | 3063077.19 | 1295                 | 74.65                  | Nursing Campus, Sanepa                    | Clay, Cobbles, Bedrock    |
| R      | Praa | 1000 | PR18  | 2           |           | 343117.02 | 3062147.12 | 1318                 | 253                    | NEPO Textile, Sallagahri Bhaktapur        | Clay, Sand                |
| R      | Praa | 1000 | PR19  | 2           |           | 343114.01 | 3061851.18 | 1330                 | 261                    | Bhadgaon Woollen Industries               | Clay, Sand, Bedrock       |
| R      | Praa | 1000 | PR22  | 2           |           | 334339.97 | 3066250.15 | 1310                 | 262                    | Meridian Hotel (Kamaladi)                 | MG, Silt, Sand            |
| R      | Praa | 1000 | PR23  | 2           |           | 333703.96 | 3069070.02 | 1317                 | 145                    | Real Estate Drinking Water                | MG, Sand, Clay            |
| R      | Praa | 1000 | PR21  | 2           |           | 334166.97 | 3063062.20 | 1323                 | 250                    | Engineering Campus, Pulchok               | Clay, Sand                |
| R      | Praa | 1000 | PR25  | 2           |           | 343417.53 | 3061183.05 | 1330                 | 150                    | Katuje Bhaktapur                          | Unknown, Silt, Bedrock    |
| R      | Praa | 1000 | PR26  | 2           |           | 333495.15 | 3066816.50 | 1307                 | 229.8                  | Hotel Center Point, Thamel                | MG, Sand, Silt, Bedrock   |
| R      | Praa | 1000 | PR27  | 2           |           | 334439.47 | 3067436.08 | 1311                 | 260.1                  | Cross Country Nepal Hotel Ltd, Lazimpat   | Sand, Silt                |
| R      | Praa | 1000 | PR28  | 2           |           | 334473.86 | 3067673.48 | 1313                 | 260                    | Hotel Ganjong, Lazimpat                   | MG, Silt, Sand            |
| R      | Praa | 1000 | PR29  | 2           |           | 338042.71 | 3072481.95 | 1382                 | 150                    | Khumbu Carpet industry, Budhanilkanth     | MG, Sand, Gravel          |
| R      | Praa | 1000 | PR30  | 2           |           | 336357.75 | 3069801.22 | 1356                 | 250                    | Australian Embassy, Bansbari              | MG, Silt, Gravel, Sand    |
| R      | Praa | 1000 | PR31  | 2           |           | 337908.76 | 3067944.19 | 1310                 | 105                    | Bhrikuti Secondary School, Saroswotinagar | MG, Sand, Silt, Gravel    |
| R      | Praa | 1000 | PR32  | 2           |           | 333277.28 | 3065291.50 | 1310                 | 260                    | Ranamukteswor business Complex, New Road  | Silt, Sand                |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location   | Material types           |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|--|--------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |  | GEOL_LEG                 |
| R      | Praa | 1000 | PR33  | 2           |           | 336799.87 | 3067481.68 | 1320                 | 204                    | OM Hospital & Research Center, Chabahil, Ring Road | Sand, Silt               |
| R      | Praa | 1000 | PR34  | 2           |           | 343333.96 | 3061702.72 | 1310                 | 240                    | Bhadgaon Carpet Washing industry, Bhaktapur        | Silt, Gravel, Sand       |
| R      | Praa | 1000 | PR35  | 2           |           | 340939.97 | 3064172.24 | 1320                 | 300                    | Bodegaon, Thimi                                    | MG, Sand, Clay           |
| R      | Praa | 1000 | PR36  | 2           |           | 333305.16 | 3065573.56 | 1308                 | 300                    | Bishal bazar business complex                      | Silt, Sand, Clay         |
| R      | Bhak | 1992 | BH1   | 2           |           | 341259.99 | 3064260.21 | 1342                 | 273.6                  |  | Sand, Clay               |
| R      | Bhak | 1992 | BH2   | 2           |           | 341053.99 | 3063842.19 | 1346                 | 265.72                 |  | Clay, Sand               |
| R      | Bhak | 1992 | BH3   | 2           |           | 342149.97 | 3064562.07 | 1331                 | 253                    |  | Sand, Clay               |
| R      | Bhak | 1992 | BH4   | 2           |           | 342098.97 | 3065045.10 | 1319                 | 252.6                  |  | Sand, Clay               |
| R      | Bhak | 1992 | BH4a  | 2           |           | 342093.97 | 3065050.22 | 1319                 | 174                    |  | Sand, Clay               |
| R      | Bhak | 1992 | BHD2  | 2           |           | 347752.01 | 3063784.17 | 1385                 | 240                    |  | Clay, Sand               |
| R      | Bhak | 1992 | DW1   | 2           |           | 343914.02 | 3067072.03 | 1324                 | 10.7                   |  | Clay, Gravel, Sand       |
| R      | Bhak | 1992 | DW2   | 2           |           | 343513.98 | 3066753.00 | 1321                 | 10.7                   |  | Sand, Gravel, Silt, Clay |
| R      | Bhak | 1992 | DW3   | 2           |           | 343223.99 | 3066254.03 | 1321                 | 10.7                   |  | Sand, Gravel, Clay       |
| R      | Bhak | 1992 | DW4   | 2           |           | 342699.01 | 3065907.05 | 1319                 | 10.8                   |  | Clay, Gravel, Sand       |
| R      | Bhak | 1992 | DW5   | 2           |           | 342251.98 | 3065589.16 | 1316                 | 10.7                   |  | Sand, Gravel, Clay       |
| R      | Bhak | 1992 | DW6   | 2           |           | 341708.99 | 3065165.10 | 1314                 | 10.7                   |  | Clay, Gravel, Sand       |
| R      | Bhak | 1992 | DW7   | 2           |           | 341237.01 | 3065031.08 | 1310                 | 10.7                   |  | Sand, Clay, Gravel       |
| R      | Bhak | 1992 | DW8   | 2           |           | 341051.99 | 3064674.06 | 1306                 | 10.7                   |  | Clay, Gravel, Sand       |
| R      | Bhak | 1992 | BKD2  | 2           |           | 345468.01 | 3060979.09 | 1375                 | 150                    |  | Clay, Sand, Gravel       |
| R      | Bhak | 1992 | BR1   | 2           |           | 341666.01 | 3064768.12 | 1320                 | 300                    |  | MG, Clay, Sand           |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location               | Material types                         |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|------------------------|--|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE |           |            |                      |                        |                        | GEOL_LEG                               |
| R      | Bhak | 1992 | TD1   | 2           |           | 340408.00 | 3062193.02 | 1300                 | 250                    |                        | MG, Clay, Sand                         |
| R      | Bhak | 1992 | CTD1  | 2           |           | 339657.98 | 3063058.10 | 1322                 | 313                    |                        | MG, Sand, Clay, Silt                   |
| R      | Bhak | 1992 | BHD1  | 2           |           | 344360.56 | 3061909.86 | 1320                 | 300                    |                        | Clay, Sand, Gravel                     |
| R      | Lali | 1000 | LD1   | 2           |           | 337149.97 | 3060110.05 | 1299                 | 220                    | Imadol Lalitpur        | MG, Clay, Sand                         |
| R      | Lali | 1000 | LD2   | 2           |           | 339407.97 | 3058923.05 | 1326                 | 220                    | Lubhu                  | Sand, Clay                             |
| R      | Agso | 1997 | AG68  | 2           |           | 333998.77 | 3061641.86 | 1315                 | 189.5                  | Patan Hospital         | MG, Silt, Clay, Sand, Cobbles, Bedrock |
| R      | Bhak | 1992 | BHD3  | 2           |           | 335127.98 | 3061107.08 | 1319                 | 195                    | B & B Hospital Guarkhu | Clay, Sand, Cobbles                    |
| R      | Unkn | 1000 | SPT01 | 3           |           | 329161.96 | 3062966.30 | 1324                 | 3.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT02 | 3           |           | 327853.96 | 3063877.29 | 1339                 | 4                      | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT03 | 3           |           | 328497.55 | 3065917.73 | 1343                 | 4                      | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT04 | 3           |           | 329713.96 | 3064280.34 | 1304                 | 1.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT05 | 3           |           | 329042.98 | 3063931.36 | 1341                 | 1.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT06 | 3           |           | 327175.97 | 3064296.36 | 1345                 | 1.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT07 | 3           |           | 327772.96 | 3064584.14 | 1348                 | 4.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT08 | 3           |           | 329351.98 | 3064825.49 | 1343                 | 5.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT09 | 3           |           | 328888.34 | 3065290.11 | 1345                 | 3.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT10 | 3           |           | 331467.96 | 3056306.44 | 1257                 | 3.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT11 | 3           |           | 330838.98 | 3059951.28 | 1295                 | 5.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT12 | 3           |           | 334282.01 | 3051181.20 | 1495                 | 3.45                   | Unknown                | Unknown                                |
| R      | Unkn | 1000 | SPT13 | 3           |           | 332938.99 | 3057935.45 | 1351                 | 5.45                   | Unknown                | Unknown                                |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location | Material types |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|----------|----------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |          | GEOL_LEG       |
| R      | Unkn | 1000 | SPT14 | 3           |           | 328617.18 | 3061422.04 | 1380                 | 2                      | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT15 | 3           |           | 329408.98 | 3061593.31 | 1368                 | 4.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT16 | 3           |           | 332069.98 | 3060298.41 | 1327                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT17 | 3           |           | 336891.01 | 3055012.37 | 1407                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT18 | 3           |           | 335125.98 | 3059515.27 | 1323                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT19 | 3           |           | 341677.08 | 3062491.27 | 1308                 | 4.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT20 | 3           |           | 337025.04 | 3060102.43 | 1319                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT21 | 3           |           | 332854.00 | 3072041.53 | 1322                 | 1.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT22 | 3           |           | 341331.04 | 3067353.34 | 1359                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT23 | 3           |           | 333410.76 | 3058700.10 | 1311                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT24 | 3           |           | 333053.97 | 3070173.39 | 1335                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT25 | 3           |           | 344640.10 | 3061217.37 | 1314                 | 4.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT26 | 3           |           | 336728.05 | 3057030.30 | 1355                 | 3                      | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT27 | 3           |           | 332458.00 | 3072079.45 | 1325                 | 6.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT28 | 3           |           | 335973.03 | 3072102.45 | 1331                 | 4                      | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT29 | 3           |           | 329602.98 | 3066674.44 | 1368                 | 4                      | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT30 | 3           |           | 328443.97 | 3067323.53 | 1361                 | 6.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT31 | 3           |           | 330847.99 | 3067792.55 | 1304                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT32 | 3           |           | 341834.06 | 3065022.40 | 1328                 | 5.45                   | Unknown  | Unknown        |
| R      | Unkn | 1000 | SPT33 | 3           |           | 332633.00 | 3062935.35 | 1301                 | 5.45                   | Unknown  | Unknown        |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location   | Material types |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|------------|----------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |            | GEOL_LEG       |
| R      | Unkn | 1000 | SPT34 | 3           |           | 336870.33 | 3060557.24 | 1316                 | 6.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT35 | 3           |           | 341775.08 | 3060638.50 | 1315                 | 5                      | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT36 | 3           |           | 339115.03 | 3069430.53 | 1348                 | 2.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT37 | 3           |           | 335221.99 | 3069849.49 | 1333                 | 6.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT38 | 3           |           | 330635.99 | 3063805.33 | 1330                 | 5.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT39 | 3           |           | 338874.02 | 3061006.32 | 1305                 | 6.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT40 | 3           |           | 339003.04 | 3064908.31 | 1312                 | 6.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT41 | 3           |           | 345266.74 | 3060381.08 | 1356                 | 6.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT42 | 3           |           | 335035.02 | 3051061.43 | 1507                 | 6.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT43 | 3           |           | 342436.34 | 3062140.03 | 1299                 | 6.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT44 | 3           |           | 326346.94 | 3064645.36 | 1353                 | 5.45                   | Unknown    | Unknown        |
| R      | Unkn | 1000 | SPT45 | 3           |           | 350172.41 | 3062457.84 | 1459                 | 6.45                   | Unknown    | Unknown        |
| IND    | Sina | 2006 | BH1   | 1           |           | 337232.00 | 3064687.45 | 1294                 | 12.45                  | Sinamangal | Sand, Silt     |
| IND    | Sina | 2006 | BH2   | 1           |           | 337232.00 | 3064687.45 | 1294                 | 12.45                  | Sinamangal | MG, Silt, Sand |
| IND    | Sina | 2006 | BH3   | 1           |           | 337232.00 | 3064687.45 | 1294                 | 12.45                  | Sinamangal | MG, Silt, Sand |
| IND    | Sina | 2006 | BH4   | 1           |           | 337232.00 | 3064687.45 | 1294                 | 12.45                  | Sinamangal | MG, Silt, Sand |
| IND    | Sina | 2006 | BH5   | 1           |           | 337232.00 | 3064687.45 | 1294                 | 12.45                  | Sinamangal | Sand, Silt     |
| IND    | Chan | 2007 | BH1   | 3           |           | 336515.28 | 3068780.85 | 1334                 |                        | Chandol    |                |
| IND    | Chan | 2007 | BH2   | 3           |           | 336515.28 | 3068780.85 | 1334                 |                        | Chandol    |                |
| IND    | Chan | 2007 | BH3   | 3           |           | 336515.28 | 3068780.85 | 1334                 |                        | Chandol    |                |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location            | Material types       |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|---------------------|----------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                     | GEOL_LEG             |
| IND    | Chan | 2007 | BH4   | 1           |           | 336515.28 | 3068780.85 | 1334                 | 20                     | Chandol             | Sand, Silt           |
| IND    | Chan | 2007 | BH5   | 1           |           | 336515.28 | 3068780.85 | 1334                 | 20                     | Chandol             | Silt, Sand           |
| IND    | Balu | 2004 | BH4   | 1           |           | 335275.29 | 3067744.39 | 1307                 | 10.05                  | Baluwatar           | MG, Sand, Clay, Silt |
| IND    | Balu | 2004 | BH5   | 1           |           | 335275.29 | 3067744.39 | 1307                 | 10.05                  | Baluwatar           | MG, Sand, Clay       |
| IND    | Biju | 1000 | BH1   | 1           |           | 335345.84 | 3064190.64 | 1286                 | 15                     | Bijulibazar         | MG, Sand, Silt       |
| IND    | Biju | 1000 | BH2   | 1           |           | 335345.84 | 3064190.64 | 1286                 | 15                     | Bijulibazar         | MG, Sand, Silt       |
| IND    | Biju | 1000 | BH3   | 1           |           | 335345.84 | 3064190.64 | 1286                 | 15                     | Bijulibazar         | MG, Sand             |
| IND    | Biju | 1000 | BH4   | 1           |           | 335345.84 | 3064190.64 | 1286                 | 15                     | Bijulibazar         | MG, Sand, Clay       |
| IND    | Biju | 1000 | BH5   | 1           |           | 335345.84 | 3064190.64 | 1286                 | 15                     | Bijulibazar         | MG, Sand, Silt       |
| IND    | Dhob | 1000 | BH1   | 1           |           | 332394.36 | 3062402.75 | 1286                 | 5                      | Dhobighat, Lalitpur | MG, Silt             |
| IND    | Dhob | 1000 | BH2   | 1           |           | 332394.36 | 3062402.75 | 1286                 | 15                     | Dhobighat, Lalitpur | MG, Silt, Sand       |
| IND    | Dhob | 1000 | BH3   | 1           |           | 332394.36 | 3062402.75 | 1286                 | 5                      | Dhobighat, Lalitpur | MG, Silt             |
| IND    | Dhob | 1000 | BH4   | 1           |           | 332394.36 | 3062402.75 | 1286                 | 15                     | Dhobighat, Lalitpur | Silt                 |
| IND    | Dhob | 1000 | BH5   | 1           |           | 332394.36 | 3062402.75 | 1286                 | 15                     | Dhobighat, Lalitpur | Silt, Sand           |
| IND    | Dhob | 1000 | BH6   | 1           |           | 332394.36 | 3062402.75 | 1286                 | 5                      | Dhobighat, Lalitpur | Silt, Sand           |
| IND    | Dhob | 1000 | BH7   | 1           |           | 332394.36 | 3062402.75 | 1286                 | 5                      | Dhobighat, Lalitpur | Silt                 |
| IND    | Bhat | 2008 | BH1   | 1           |           | 335412.10 | 3067210.17 | 1309                 | 20.2692                | Bhatbhateni         | MG, Sand, Silt       |
| IND    | Bhat | 2008 | BH2   | 1           |           | 335412.10 | 3067210.17 | 1309                 | 20.2692                | Bhatbhateni         | MG, Silt, Sand       |
| IND    | Sane | 2007 | BH1   | 1           |           | 333070.93 | 3063723.48 | 1288                 | 15.45                  | Sanepa, Lalitpur    | MG, Silt             |
| IND    | Sane | 2007 | BH2   | 1           |           | 333070.93 | 3063723.48 | 1288                 | 15.45                  | Sanepa, Lalitpur    | MG, Silt             |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location         | Material types |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|------------------|----------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                  | GEOL_LEG       |
| IND    | Sane | 2007 | BH3   | 1           |           | 333070.93 | 3063723.48 | 1288                 | 15.45                  | Sanepa, Lalitpur | MG, Silt       |
| IND    | Sane | 2007 | BH4   | 1           |           | 333070.93 | 3063723.48 | 1288                 | 15.45                  | Sanepa, Lalitpur | MG, Silt, Sand |
| IND    | Sane | 2007 | BH5   | 1           |           | 333070.93 | 3063723.48 | 1288                 | 15.45                  | Sanepa, Lalitpur | MG, Silt       |
| IND    | Taha | 2007 | BH1   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Silt, Sand |
| IND    | Taha | 2007 | BH2   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Silt       |
| IND    | Taha | 2007 | BH3   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | Silt           |
| IND    | Taha | 2007 | BH4   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Silt       |
| IND    | Taha | 2007 | BH5   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Silt       |
| IND    | Taha | 2007 | BH6   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Sand       |
| IND    | Taha | 2007 | BH7   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Sand       |
| IND    | Taha | 2007 | BH8   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Sand       |
| IND    | Taha | 2007 | BH9   | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Sand       |
| IND    | Taha | 2007 | BH10  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Sand, Silt |
| IND    | Taha | 2007 | BH11  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 19.95                  | Tahachal         | MG, Silt, Sand |
| IND    | Taha | 2007 | BH12  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 19.95                  | Tahachal         | MG, Silt, Sand |
| IND    | Taha | 2007 | BH13  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 19.95                  | Tahachal         | MG, Silt, Sand |
| IND    | Taha | 2007 | BH14  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 19.95                  | Tahachal         | MG, Silt, Sand |
| IND    | Taha | 2007 | BH15  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Sand, Silt |
| IND    | Taha | 2007 | BH16  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Sand, Silt |
| IND    | Taha | 2007 | BH17  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 15.45                  | Tahachal         | MG, Silt, Sand |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location        | Material types   |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|-----------------|------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                 | GEOL_LEG         |
| IND    | Taha | 2007 | BH18  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 19                     | Tahachal        | MG, Sand, Silt   |
| IND    | Taha | 2007 | BH19  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 20                     | Tahachal        | MG, Sand         |
| IND    | Taha | 2007 | BH20  | 1           |           | 332030.47 | 3065320.23 | 1304                 | 20                     | Tahachal        | MG, Sand         |
| IND    | Ravi | 2008 | BH1   | 1           |           | 331556.67 | 3064540.08 | 1306                 | 20                     | Ravibhawan, Ktm | MG, Silt         |
| IND    | Ravi | 2008 | BH2   | 1           |           | 331556.67 | 3064540.08 | 1306                 | 20                     | Ravibhawan, Ktm | MG, Silt         |
| IND    | Ravi | 2008 | BH3   | 1           |           | 331556.67 | 3064540.08 | 1306                 | 20                     | Ravibhawan, Ktm | MG, Silt         |
| IND    | Ravi | 2008 | BH4   | 1           |           | 331556.67 | 3064540.08 | 1306                 | 40                     | Ravibhawan, Ktm | MG, Silt         |
| IND    | Solt | 2007 | BH1   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 15                     | Soltimod        | MG, Silt         |
| IND    | Solt | 2007 | BH2   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 12                     | Soltimod        | MG, Silt         |
| IND    | Solt | 2007 | BH3   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 12                     | Soltimod        | MG, Silt         |
| IND    | Solt | 2007 | BH4   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 15                     | Soltimod        | MG, Silt         |
| IND    | Solt | 2007 | BH5   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 15                     | Soltimod        | MG, Silt         |
| IND    | Dhum | 2007 | BH1   | 1           |           | 336715.92 | 3068475.08 | 1322                 | 20                     | Dhumbarahi      | MG, Sand, Silt   |
| IND    | Dhum | 2007 | BH2   | 1           |           | 336715.92 | 3068475.08 | 1322                 | 21                     | Dhumbarahi      | MG, Sand, Silt   |
| IND    | Dhum | 2007 | BH3   | 1           |           | 336715.92 | 3068475.08 | 1322                 | 20                     | Dhumbarahi      | MG, Sand, Silt   |
| IND    | Pani | 2008 | BH1   | 1           |           | 334877.56 | 3068138.12 | 1321                 | 20                     | Panipokhari     | MG, Silt, Sand   |
| IND    | Pani | 2008 | BH2   | 1           |           | 334877.56 | 3068138.12 | 1321                 | 20                     | Panipokhari     | Silt, Sand       |
| IND    | Lazi | 2008 | BH3   | 1           |           | 334642.91 | 3067844.33 | 1309                 | 20                     | Lazimpat        | MG, Sand, Silt   |
| IND    | Lazi | 2008 | BH4   | 1           |           | 334642.91 | 3067844.33 | 1309                 | 20                     | Lazimpat        | MG, Silt, Sand   |
| IND    | Kule | 2007 | BH1   | 1           |           | 332078.56 | 3063818.95 | 1278                 | 20                     | Kuleshwor       | MG, Gravel, Silt |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location           | Material types         |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|--------------------|------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                    | GEOL_LEG               |
| IND    | Kule | 2007 | BH2   | 1           |           | 332078.56 | 3063818.95 | 1278                 | 20                     | Kuleshwor          | MG, Silt               |
| IND    | Kule | 2007 | BH3   | 1           |           | 332078.56 | 3063818.95 | 1278                 | 20                     | Kuleshwor          | MG, Silt, Gravel, Sand |
| IND    | Sane | 1000 | BH1   | 1           |           | 333080.73 | 3062621.97 | 1309                 | 15                     | Sanepa, Lalitpur   | MG, Silt               |
| IND    | Sane | 1000 | BH2   | 1           |           | 333080.73 | 3062621.97 | 1309                 | 15                     | Sanepa, Lalitpur   | MG, Gravel, Silt       |
| IND    | Sane | 1000 | BH3   | 1           |           | 333080.73 | 3062621.97 | 1309                 | 17                     | Sanepa, Lalitpur   | MG, Sand, Silt         |
| IND    | Kupo | 1000 | BH1   | 1           |           | 334342.04 | 3063577.43 | 1283                 | 15                     | Kupondole          | MG, Clay               |
| IND    | Kupo | 1000 | BH2   | 1           |           | 334342.04 | 3063577.43 | 1283                 | 12                     | Kupondole          | Clay, Unknown          |
| IND    | Sank | 2008 | BH1   | 1           |           | 335615.22 | 3062786.30 | 1286                 | 20                     | Sankhamul          | MG, Sand, Silt         |
| IND    | Sank | 2008 | BH2   | 1           |           | 335615.22 | 3062786.30 | 1286                 | 20                     | Sankhamul          | MG, Sand, Silt         |
| IND    | Sank | 2008 | BH3   | 1           |           | 335615.22 | 3062786.30 | 1286                 | 20                     | Sankhamul          | MG, Sand, Silt         |
| IND    | Sank | 2008 | BH4   | 1           |           | 335615.22 | 3062786.30 | 1286                 | 20                     | Sankhamul          | MG, Sand, Silt         |
| IND    | Sank | 2008 | BH5   | 1           |           | 335615.22 | 3062786.30 | 1286                 | 20                     | Sankhamul          | MG, Sand, Silt         |
| IND    | Kama | 2008 | BH1   | 1           |           | 334941.95 | 3066431.03 | 1305                 | 25                     | Kamalpokhari       | MG, Sand               |
| IND    | Kama | 2008 | BH2   | 1           |           | 334941.95 | 3066431.03 | 1305                 | 25                     | Kamalpokhari       | MG, Sand, Silt         |
| IND    | Kama | 2008 | BH3   | 1           |           | 334941.95 | 3066431.03 | 1305                 | 25                     | Kamalpokhari       | MG, Sand, Silt         |
| IND    | Kama | 2008 | BH4   | 1           |           | 334941.95 | 3066431.03 | 1305                 | 25                     | Kamalpokhari       | Silt, Sand             |
| IND    | Kama | 2008 | BH5   | 1           |           | 334941.95 | 3066431.03 | 1305                 | 25                     | Kamalpokhari       | Sand, Silt             |
| IND    | Kama | 2008 | BH6   | 1           |           | 334941.95 | 3066431.03 | 1305                 | 20                     | Kamalpokhari       | Sand, Silt             |
| IND    | Kama | 2008 | BH7   | 1           |           | 334941.95 | 3066431.03 | 1305                 | 20                     | Kamalpokhari       | Sand, Silt             |
| IND    | Pulc | 2008 | BH1   | 1           |           | 333446.52 | 3062562.11 | 1312                 | 25                     | Pulchowk, Lalitpur | MG, Silt, Clay         |

*Table 23 – Database overview (continued)*

| Source | Code | Year  | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                    | Material types       |
|--------|------|-------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|-----------------------------|----------------------|
|        |      |       |       | LOCA_LOGQ   | LOCA_NATE |           |            |                      |                        |                             | GEOL_LEG             |
| IND    | Pulc | 2008  | BH2   | 1           |           | 333446.52 | 3062562.11 | 1312                 | 30.45                  | Pulchowk, Lalitpur          | MG, Silt, Sand, Clay |
| IND    | Pulc | 2008  | BH3   | 1           |           | 333446.52 | 3062562.11 | 1312                 | 30.45                  | Pulchowk, Lalitpur          | MG, Silt             |
| IND    | Solt | 2008a | BH1   | 1           |           | 332025.88 | 3065281.48 | 1300                 | 15.45                  | Soltimod                    | MG, Silt             |
| IND    | Solt | 2008a | BH2   | 1           |           | 332025.88 | 3065281.48 | 1300                 | 15.45                  | Soltimod                    | Silt                 |
| IND    | Solt | 2008a | BH3   | 1           |           | 332025.88 | 3065281.48 | 1300                 | 15.45                  | Soltimod                    | Silt                 |
| IND    | Solt | 2008a | BH4   | 1           |           | 332025.88 | 3065281.48 | 1300                 | 15.45                  | Soltimod                    | MG, Silt             |
| IND    | Solt | 2008a | BH5   | 1           |           | 332025.88 | 3065281.48 | 1300                 | 15.45                  | Soltimod                    | MG, Silt             |
| IND    | Dill | 2008  | BH1   | 1           |           | 335124.40 | 3066009.23 | 1304                 | 20                     | Dillibazar, Charkhal, Bajaj | MG, Sand, Silt       |
| IND    | Dill | 2008  | BH2   | 1           |           | 335124.40 | 3066009.23 | 1304                 | 20                     | Dillibazar, Charkhal, Bajaj | MG, Silt, Sand       |
| IND    | Dill | 2008  | BH3   | 1           |           | 335124.40 | 3066009.23 | 1304                 | 20                     | Dillibazar, Charkhal, Bajaj | MG, Silt, Sand       |
| IND    | Gyan | 2008  | BH1   | 1           |           | 335630.27 | 3066169.82 | 1307                 | 15.45                  | Gyaneshwor                  | MG, Sand, Clay       |
| IND    | Gyan | 2008  | BH2   | 1           |           | 335630.27 | 3066169.82 | 1307                 | 20                     | Gyaneshwor                  | MG, Silt, Sand, Clay |
| IND    | Sane | 2009  | BH1   | 1           |           | 332786.66 | 3062960.21 | 1307                 | 25                     | Sanepa, Lalitpur            | Silt                 |
| IND    | Sane | 2009  | BH2   | 1           |           | 332786.66 | 3062960.21 | 1307                 | 25                     | Sanepa, Lalitpur            | MG, Silt             |
| IND    | Sane | 2009  | BH3   | 1           |           | 332786.66 | 3062960.21 | 1307                 | 25                     | Sanepa, Lalitpur            | MG, Silt             |
| IND    | Sane | 2009  | BH4   | 1           |           | 332786.66 | 3062960.21 | 1307                 | 25                     | Sanepa, Lalitpur            | MG, Silt             |
| IND    | Sane | 2009  | BH5   | 1           |           | 332786.66 | 3062960.21 | 1307                 | 25                     | Sanepa, Lalitpur            | MG, Silt             |
| IND    | Bish | 2007  | BH1   | 1           |           | 336045.52 | 3067643.60 | 1311                 | 20                     | Bishalnagar                 | MG, Sand, Silt       |
| IND    | Bish | 2007  | BH2   | 1           |           | 336045.52 | 3067643.60 | 1311                 | 20                     | Bishalnagar                 | Silt, Sand           |
| IND    | Bish | 2007  | BH3   | 1           |           | 336045.52 | 3067643.60 | 1311                 | 20                     | Bishalnagar                 | MG, Silt, Sand       |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location          | Material types               |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|-------------------|------------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                   | GEOL_LEG                     |
| IND    | Bish | 2007 | BH4   | 1           |           | 336045.52 | 3067643.60 | 1311                 | 20                     | Bishalnagar       | Sand, Silt                   |
| IND    | Bish | 2007 | BH5   | 1           |           | 336045.52 | 3067643.60 | 1311                 | 20                     | Bishalnagar       | Sand, Silt                   |
| IND    | Sano | 2008 | BH1   | 1           |           | 335577.45 | 3066323.42 | 1307                 | 25                     | Sanogaucharan     | MG, Clay, Sand, Silt, Gravel |
| IND    | Sano | 2008 | BH2   | 1           |           | 335577.45 | 3066323.42 | 1307                 | 25                     | Sanogaucharan     | MG, Sand                     |
| IND    | Sano | 2008 | BH3   | 1           |           | 335577.45 | 3066323.42 | 1307                 | 25                     | Sanogaucharan     | Silt, Sand                   |
| IND    | Sane | 1001 | BH1   | 1           |           | 333024.78 | 3063318.61 | 1307                 | 20                     | Sanepa, Lalitpur  | MG, Silt, Clay               |
| IND    | Sane | 1001 | BH2   | 1           |           | 333024.78 | 3063318.61 | 1307                 | 20                     | Sanepa, Lalitpur  | Silt, Clay                   |
| IND    | Tokh | 2007 | BH1   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 8.5                    | Tokha             | Sand                         |
| IND    | Tokh | 2007 | BH2   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 8.5                    | Tokha             | Sand                         |
| IND    | Tokh | 2007 | BH3   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 8.5                    | Tokha             | Sand                         |
| IND    | Tokh | 2007 | BH4   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 8.5                    | Tokha             | Sand                         |
| IND    | Tokh | 2007 | BH5   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 8.5                    | Tokha             | Sand                         |
| IND    | Hatt | 1000 | BH1   | 1           |           | 335892.22 | 3058916.58 | 1309                 | 20                     | Hattiban          | MG, Silt, Gravel             |
| IND    | Hatt | 1000 | BH2   | 1           |           | 335892.22 | 3058916.58 | 1309                 | 20                     | Hattiban          | MG, Silt                     |
| IND    | Hatt | 1000 | BH3   | 1           |           | 335892.22 | 3058916.58 | 1309                 | 20                     | Hattiban          | Sand, Silt                   |
| IND    | Hatt | 1000 | BH4   | 1           |           | 335892.22 | 3058916.58 | 1309                 | 20                     | Hattiban          | MG, Gravel, Silt             |
| IND    | Hatt | 1000 | BH5   | 1           |           | 335892.22 | 3058916.58 | 1309                 | 20                     | Hattiban          | MG, Gravel, Sand, Silt       |
| IND    | Hatt | 1000 | BH6   | 1           |           | 335892.22 | 3058916.58 | 1309                 | 20                     | Hattiban          | MG, Sand, Silt               |
| IND    | Balk | 2009 | BH1   | 1           |           | 336173.65 | 3062097.71 | 1289                 | 25                     | Balaju, Kathmandu | MG, Silt, Sand               |
| IND    | Balk | 2009 | BH2   | 1           |           | 336173.65 | 3062097.71 | 1289                 | 25                     | Balaju, Kathmandu | MG, Silt                     |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location          | Material types         |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|-------------------|------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                   | GEOL_LEG               |
| IND    | Balk | 2009 | BH3   | 1           |           | 336173.65 | 3062097.71 | 1289                 | 30.45                  | Balaju, Kathmandu | MG, Silt, Sand         |
| IND    | Balk | 2009 | BH4   | 1           |           | 336173.65 | 3062097.71 | 1289                 | 25                     | Balaju, Kathmandu | MG, Silt, Sand         |
| IND    | Sane | 1002 | BH1   | 1           |           | 332786.66 | 3062960.21 | 1307                 | 20                     | Sanepa, Lalitpur  | MG, Clay               |
| IND    | Sane | 1002 | BH2   | 1           |           | 332786.66 | 3062960.21 | 1307                 | 20                     | Sanepa, Lalitpur  | MG, Clay               |
| IND    | Dhap | 2009 | BH1   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 25                     | Dhapasi, Tokha    | MG, Sand, Silt         |
| IND    | Dhap | 2009 | BH2   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 25                     | Dhapasi, Tokha    | MG, Gravel, Sand, Silt |
| IND    | Dhap | 2009 | BH3   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 25                     | Dhapasi, Tokha    | MG, Silt, Sand         |
| IND    | Dhap | 2009 | BH4   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 25                     | Dhapasi, Tokha    | MG, Sand, Silt         |
| IND    | Dhap | 2009 | BH5   | 1           |           | 335087.00 | 3071046.92 | 1315                 | 25                     | Dhapasi, Tokha    | MG, Sand, Silt         |
| IND    | Ghat | 2009 | BH1   | 1           |           | 335117.75 | 3065259.54 | 1300                 | 15.45                  | Ghattekulo        | MG, Silt, Sand         |
| IND    | Ghat | 2009 | BH2   | 1           |           | 335117.75 | 3065259.54 | 1300                 | 15.45                  | Ghattekulo        | MG, Silt, Sand         |
| IND    | Ghat | 2009 | BH3   | 1           |           | 335117.75 | 3065259.54 | 1300                 | 15.45                  | Ghattekulo        | MG, Silt, Sand         |
| IND    | Ghat | 2009 | BH4   | 1           |           | 335117.75 | 3065259.54 | 1300                 | 15.45                  | Ghattekulo        | MG, Silt, Sand         |
| IND    | Kada | 1000 | BH1   | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari         | Sand                   |
| IND    | Kada | 1000 | BH2   | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari         | Sand                   |
| IND    | Kada | 1000 | BH3   | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari         | Sand                   |
| IND    | Kada | 1000 | BH4   | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari         | Sand                   |
| IND    | Kada | 1000 | BH5   | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari         | Sand, Silt             |
| IND    | Kada | 1000 | BH6   | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari         | Sand                   |
| IND    | Kada | 1000 | BH7   | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari         | Sand                   |

*Table 23 – Database overview (continued)*

| Source | Code | Year  | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                     | Material types                  |
|--------|------|-------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|------------------------------|---------------------------------|
|        |      |       |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                              | GEOL_LEG                        |
| IND    | Kada | 1000  | BH8   | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari                    | Sand                            |
| IND    | Kada | 1000  | BH10  | 1           |           | 339412.04 | 3064290.20 | 1302                 | 20                     | Kadaghari                    | Sand                            |
| IND    | Sane | 2009a | BH1   | 1           |           | 333080.73 | 3062621.97 | 1309                 | 35                     | Sanepa, Lalitpur             | MG, Silt, Gravel, Clay, Sand    |
| IND    | Sane | 2009a | BH2   | 1           |           | 333080.73 | 3062621.97 | 1309                 | 35                     | Sanepa, Lalitpur             | MG, Silt                        |
| IND    | Sane | 2009a | BH3   | 1           |           | 333080.73 | 3062621.97 | 1309                 | 35                     | Sanepa, Lalitpur             | MG, Gravel, Unknown, Silt, Sand |
| IND    | Thad | 2009  | BH1   | 1           |           | 333132.01 | 3062717.21 | 1309                 | 30.45                  | Thadodunga, Sanepa, Lalitpur | Gravel, Sand                    |
| IND    | Thad | 2009  | BH2   | 1           |           | 333132.01 | 3062717.21 | 1309                 | 30.45                  | Thadodunga, Sanepa, Lalitpur | Gravel, Sand, Silt              |
| IND    | Thad | 2009  | BH3   | 1           |           | 333132.01 | 3062717.21 | 1309                 | 30.45                  | Thadodunga, Sanepa, Lalitpur | Gravel, Sand, Silt              |
| IND    | Thad | 2009  | BH4   | 1           |           | 333132.01 | 3062717.21 | 1309                 | 30.45                  | Thadodunga, Sanepa, Lalitpur | Gravel, Silt, Sand              |
| IND    | Baba | 2008  | BH1   | 1           |           | 334684.56 | 3064437.12 | 1288                 | 35                     | Babarmahal                   | MG, Sand, Clay, Silt            |
| IND    | Baba | 2008  | BH2   | 1           |           | 334684.56 | 3064437.12 | 1288                 | 35                     | Babarmahal                   | MG, Clay, Sand, Silt            |
| IND    | Baba | 2008  | BH3   | 1           |           | 334684.56 | 3064437.12 | 1288                 | 35                     | Babarmahal                   | MG, Silt, Sand, Clay            |
| IND    | Baba | 2008  | BH4   | 1           |           | 334684.56 | 3064437.12 | 1288                 | 35                     | Babarmahal                   | MG, Silt, Sand, Clay            |
| IND    | Baba | 2008  | BH5   | 1           |           | 334684.56 | 3064437.12 | 1288                 | 35                     | Babarmahal                   | MG, Silt, Sand, Clay            |
| IND    | Balk | 2009a | BH1   | 1           |           | 336173.65 | 3062097.71 | 1289                 | 30                     | Balkumari, Lalitpur          | Silt                            |
| IND    | Balk | 2009a | BH2   | 1           |           | 336173.65 | 3062097.71 | 1289                 | 30.45                  | Balkumari, Lalitpur          | Silt                            |
| IND    | Balk | 2009a | BH3   | 1           |           | 336173.65 | 3062097.71 | 1289                 | 30.45                  | Balkumari, Lalitpur          | MG, Silt                        |
| IND    | Batt | 2005  | BH1   | 1           |           | 336357.15 | 3064437.12 | 1308                 | 15.45                  | Battishputali                | MG, Silt, Sand                  |
| IND    | Batt | 2005  | BH2   | 1           |           | 336357.15 | 3064437.12 | 1308                 | 15.45                  | Battishputali                | MG, Silt, Sand                  |
| IND    | Batt | 2005  | BH3   | 1           |           | 336357.15 | 3064437.12 | 1308                 | 15.45                  | Battishputali                | MG, Silt, Sand                  |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location         | Material types         |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|------------------|------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                  | GEOL_LEG               |
| IND    | Solt | 2008 | BH1   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 25.95                  | Soltimod         | MG, Silt, Sand         |
| IND    | Solt | 2008 | BH2   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 35                     | Soltimod         | MG, Silt, Sand         |
| IND    | Solt | 2008 | BH3   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 25.95                  | Soltimod         | MG, Silt, Sand         |
| IND    | Solt | 2008 | BH4   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 25.95                  | Soltimod         | MG, Silt, Sand         |
| IND    | Solt | 2008 | BH5   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 35                     | Soltimod         | MG, Silt, Sand         |
| IND    | Solt | 2008 | BH6   | 1           |           | 331480.72 | 3065026.43 | 1291                 | 25.95                  | Soltimod         | MG, Silt, Sand         |
| IND    | Mach | 2012 | BH1   | 1           |           | 323876.28 | 3064698.87 | 1461                 | 15.45                  | Machhegaun       | MG, Silt, Gravel       |
| IND    | Mach | 2012 | BH2   | 1           |           | 323876.28 | 3064698.87 | 1461                 | 15.45                  | Machhegaun       | MG, Silt, Gravel       |
| IND    | Mach | 2012 | BH3   | 1           |           | 323876.28 | 3064698.87 | 1461                 | 15.45                  | Machhegaun       | MG, Silt, Gravel       |
| IND    | Naxa | 1000 | BH1   | 1           |           | 335080.21 | 3066984.64 | 1307                 | 25                     | Naxal            | MG, Sand, Silt         |
| IND    | Naxa | 1000 | BH2   | 1           |           | 335104.66 | 3066978.78 | 1307                 | 25                     | Naxal            | MG, Silt, Sand         |
| IND    | Naxa | 1000 | BH3   | 1           |           | 335095.54 | 3066953.78 | 1307                 | 25                     | Naxal            | MG, Silt, Sand         |
| IND    | Unkn | 1001 | BH1   | 1           |           |           |            |                      | 12                     | Unknown          | MG, Sand, Silt         |
| IND    | Unkn | 1001 | BH2   | 1           |           |           |            |                      | 13                     | Unknown          | MG, Sand, Silt         |
| IND    | Unkn | 1001 | BH3   | 1           |           |           |            |                      | 11                     | Unknown          | MG, Sand, Silt         |
| IND    | Unkn | 1001 | BH4   | 1           |           |           |            |                      | 10.45                  | Unknown          | MG, Sand, Clay         |
| IND    | Unkn | 1001 | BH5   | 1           |           |           |            |                      | 10.45                  | Unknown          | MG, Sand, Clay         |
| IND    | Hanu | 1002 | BH1   | 1           |           | 335171.60 | 3064287.92 | 1286                 | 20                     | Hanumansthan     | MG, Sand, Silt         |
| IND    | Hanu | 1002 | BH2   | 1           |           | 335171.13 | 3064290.90 | 1286                 | 20                     | Hanumansthan     | MG, Sand, Silt         |
| R      | JICA | 2014 | TA1   | 1           |           | 324292.00 | 3065274.00 | 1403                 | 26                     | Imakhel, Thankot | MG, Silt, Gravel, Clay |

*Table 23 – Database overview (continued)*

| Source | Code | Year  | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                  | Material types            |
|--------|------|-------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|---------------------------|---------------------------|
|        |      |       |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                           | GEOL_LEG                  |
| R      | JICA | 2014  | TB1   | 1           |           | 323789.00 | 3065693.00 | 1410                 | 26                     | Bad Bhanjang              | MG, Clay, Sand, Bedrock   |
| R      | JICA | 2014  | TC1   | 1           |           | 324847.00 | 3065441.00 | 1386                 | 31                     | Imakhel, Thankot          | MG, Sand, Silt, Bedrock   |
| R      | JICA | 2014  | TD1   | 1           |           | 322652.00 | 3066002.00 | 1308                 | 15.5                   | Sisne Khola, Bad Bhanjang | Bedrock                   |
| R      | JICA | 2014  | TE1   | 1           |           | 324793.00 | 3065490.00 | 1438                 | 25                     | Imakhel, Thankot          | MG, Gravel, Sand, Bedrock |
| IND    | Balk | 2009b | A1    | 1           |           | 336469.84 | 3061909.01 | 1286                 | 30                     | Balkumari, Lalitpur       | Sand, Silt, Clay          |
| IND    | Balk | 2009b | B1    | 1           |           | 336469.84 | 3061909.01 | 1286                 | 10                     | Balkumari, Lalitpur       | Sand, Clay                |
| IND    | Balk | 2009b | B2    | 1           |           | 336469.84 | 3061909.01 | 1286                 | 20                     | Balkumari, Lalitpur       | Sand, Clay                |
| IND    | Balk | 2009b | F1    | 1           |           | 336469.84 | 3061909.01 | 1286                 | 15                     | Balkumari, Lalitpur       | Sand, Clay                |
| IND    | Balk | 2009b | F2    | 1           |           | 336469.84 | 3061909.01 | 1286                 | 30                     | Balkumari, Lalitpur       | Sand, Silt                |
| IND    | Balk | 2009b | F3    | 1           |           | 336469.84 | 3061909.01 | 1286                 | 30                     | Balkumari, Lalitpur       | Sand, Clay                |
| IND    | Balk | 2009b | F4    | 1           |           | 336469.84 | 3061909.01 | 1286                 | 15                     | Balkumari, Lalitpur       | Sand, Clay                |
| IND    | Dhap | 2008  | BH1   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Clay, Gravel          |
| IND    | Dhap | 2008  | BH2   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Sand, Clay            |
| IND    | Dhap | 2008  | BH3   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Clay, Silt            |
| IND    | Dhap | 2008  | BH4   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Gravel, Clay, Silt    |
| IND    | Dhap | 2008  | BH5   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Silt, Clay, Sand      |
| IND    | Dhap | 2008  | BH6   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Clay, Silt, Sand      |
| IND    | Dhap | 2008  | BH7   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Silt, Sand            |
| IND    | Dhap | 2008  | BH8   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Silt, Clay, Sand      |
| IND    | Dhap | 2008  | BH9   | 1           |           | 334728.98 | 3058552.61 | 1318                 | 35                     | Dhapakhel                 | MG, Unknown, Sand, Silt   |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                | Material types       |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|-------------------------|----------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |                         | GEOL_LEG             |
| IND    | Dhap | 2008 | BH10  | 3           |           | 334728.98 | 3058552.61 | 1318                 |                        | Dhapakhel               |                      |
| IND    | Bakh | 2006 | BH1   | 1           |           | 333849.68 | 3063302.04 | 1307                 | 30                     | Royal Norwegian Embassy | MG, Clay             |
| IND    | Bakh | 2006 | BH2   | 1           |           | 333849.68 | 3063302.04 | 1307                 | 15                     | Royal Norwegian Embassy | MG, Clay, Silt       |
| IND    | Bakh | 2006 | BH3   | 1           |           | 333849.68 | 3063302.04 | 1307                 | 20                     | Royal Norwegian Embassy | MG, Silt, Clay       |
| IND    | Bakh | 2006 | BH4   | 1           |           | 333849.68 | 3063302.04 | 1307                 | 30.45                  | Royal Norwegian Embassy | MG, Silt, Clay       |
| IND    | Bakh | 2006 | BH5   | 1           |           | 333849.68 | 3063302.04 | 1307                 | 15                     | Royal Norwegian Embassy | MG, Sand, Clay, Silt |
| IND    | Bakh | 2006 | BH6   | 1           |           | 333849.68 | 3063302.04 | 1307                 | 15                     | Royal Norwegian Embassy | MG, Clay, Sand, Silt |
| IND    | Jaga | 2010 | BH1   | 1           |           | 344989.02 | 3061115.98 | 1319                 | 16                     | Jagati, Bhakatapur      | Sand, Silt, Gravel   |
| IND    | Jaga | 2010 | BH2   | 1           |           | 344989.02 | 3061115.98 | 1319                 | 16                     | Jagati, Bhakatapur      | Sand, Silt           |
| IND    | Kote | 2008 | BH1   | 1           |           | 336722.02 | 3062321.18 | 1307                 | 35                     | Koteshwor               | MG, Sand, Silt, Clay |
| IND    | Kote | 2008 | BH2   | 1           |           | 336722.02 | 3062321.18 | 1307                 | 35                     | Koteshwor               | MG, Clay, Silt       |
| IND    | Kote | 2008 | BH3   | 1           |           | 336722.02 | 3062321.18 | 1307                 | 35                     | Koteshwor               | MG, Sand, Silt, Clay |
| IND    | Kote | 2008 | BH4   | 1           |           | 336722.02 | 3062321.18 | 1307                 | 35                     | Koteshwor               | MG, Sand, Silt, Clay |
| IND    | Kote | 2008 | BH5   | 1           |           | 336722.02 | 3062321.18 | 1307                 | 35                     | Koteshwor               | MG, Sand, Silt, Clay |
| R      | JRAP | 2016 | BH1   | 1           |           | 334046.66 | 3071675.13 | 1315                 | 15                     | Manamaiju               | MG, Sand             |
| R      | JRAP | 2016 | BH2   | 1           |           | 343792.72 | 3066158.07 | 1341                 | 15                     | NEC                     | MG, Sand, Gravel     |
| R      | JRAP | 2016 | BH3   | 1           |           | 336391.73 | 3061845.01 | 1288                 | 15                     | Imadol                  | Clay, Gravel         |
| R      | JRAP | 2016 | BH4   | 1           |           | 327938.87 | 3067214.14 | 1356                 | 15                     | Ramkot                  | Clay                 |
| R      | JRAP | 2016 | BH5   | 1           |           | 338700.44 | 3063455.80 | 1297                 | 15                     | Manahara                | Clay, Gravel, Sand   |
| RES    | Pokh | 2006 | BH6   | 2           |           | 332560.11 | 3059972.86 | 1346                 | 30                     | Bhainsepatti            | Sand, Silt           |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location                 | Material types                         |
|--------|------|------|-------|-------------|-----------|------------|----------------------|------------------------|--------------------------|--|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN  | LOCA_GL              | LOCA_FDEP              | LOCA_Rem                 | GEOL_LEG                               |
| RES    | Pokh | 2006 | BH7   | 2           | 334386.68 | 3061615.39 | 1318                 | 285                    | Patan Hospital           | Gravel, Sand, Clay, Bedrock            |
| IND    | Bans | 2007 | BH1   | 1           | 336366.23 | 3069746.10 | 1353                 | 35                     | Australian Embassy       | Sand                                   |
| IND    | Bans | 2007 | BH2   | 1           | 336366.23 | 3069746.10 | 1353                 | 15                     | Australian Embassy       | Sand, Clay                             |
| IND    | Bans | 2007 | BH3   | 1           | 336366.23 | 3069746.10 | 1353                 | 32                     | Australian Embassy       | MG, Silt, Sand, Clay                   |
| IND    | Bans | 2007 | BH4   | 1           | 336366.23 | 3069746.10 | 1353                 | 15                     | Australian Embassy       | MG, Sand                               |
| IND    | Bans | 2007 | BH5   | 1           | 336366.23 | 3069746.10 | 1353                 | 31                     | Australian Embassy       | MG, Sand, Silt, Clay                   |
| IND    | Bans | 2007 | BH6   | 1           | 336366.23 | 3069746.10 | 1353                 | 31                     | Australian Embassy       | MG, Sand, Clay                         |
| IND    | Bans | 2007 | BH7   | 1           | 336366.23 | 3069746.10 | 1353                 | 15                     | Australian Embassy       | MG, Clay, Sand                         |
| IND    | Bans | 2007 | BH8   | 1           | 336366.23 | 3069746.10 | 1353                 | 31                     | Australian Embassy       | Silt, Sand, Clay                       |
| IND    | Bans | 2007 | BH9   | 1           | 336366.23 | 3069746.10 | 1353                 | 31                     | Australian Embassy       | MG, Sand                               |
| RES    | Safe | 2018 | BH1   | 1           | 334845.89 | 3065694.24 | 1309                 | 30                     | Dillibazar, Kanya School | MG, Unknown, Sand, Silt, Clay, Gravel  |
| RES    | Safe | 2018 | BH2   | 1           | 332420.85 | 3066213.89 | 1292                 | 20                     | Bijeshwori               | MG, Sand, Unknown, Silt, Peat, Bedrock |
| IND    | Kaus | 2017 | BH1   | 1           | 338668.00 | 3062646.72 | 1281                 | 15.5                   | Kaushaltar, Bhaktapur    | Silt, Sand, Clay                       |
| IND    | Kaus | 2017 | BH2   | 1           | 338550.02 | 3062654.38 | 1305                 | 15.5                   | Kaushaltar, Bhaktapur    | MG, Clay, Sand, Silt                   |
| IND    | Kaus | 2017 | BH3   | 1           | 338462.80 | 3062483.22 | 1299                 | 10.5                   | Kaushaltar, Bhaktapur    | MG, Clay, Silt, Sand                   |
| IND    | Goda | 2018 | BH1   | 1           | 335295.68 | 3053364.41 | 1473                 | 12                     | Chapagaun                | MG, Clay                               |
| IND    | Goda | 2018 | BH2   | 1           | 335295.68 | 3053364.41 | 1473                 | 12                     | Chapagaun                | Clay, Gravel                           |
| IND    | Goda | 2018 | BH3   | 1           | 335295.68 | 3053364.41 | 1473                 | 12                     | Chapagaun                | Clay, Gravel                           |
| RES    | Kate | 1996 | LOC1  | 3           | 333560.00 | 3065230.00 |                      |                        | Sundhara                 |  |
| RES    | Kate | 1996 | LOC2  | 3           | 333560.00 | 3065230.00 |                      |                        | Sundhara                 |  |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location    | Material types |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|-------------|----------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE |           |            |                      |                        |             | GEOL_LEG       |
| RES    | Kate | 1996 | LOC3  | 3           |           | 333560.00 | 3065230.00 |                      |                        | Sundhara    |                |
| RES    | Kate | 1996 | LOC4  | 3           |           | 333560.00 | 3065230.00 |                      |                        | Sundhara    |                |
| RES    | Kate | 1996 | LOC5  | 3           |           | 333560.00 | 3065230.00 |                      |                        | Sundhara    |                |
| RES    | Kate | 1996 | LOC6  | 3           |           | 334130.00 | 3064830.00 |                      |                        | Tripureswor |                |
| RES    | Kate | 1996 | LOC7  | 3           |           | 334130.00 | 3064830.00 |                      |                        | Tripureswor |                |
| RES    | Kate | 1996 | LOC8  | 3           |           | 332707.00 | 3064630.00 |                      |                        | Teku        |                |
| RES    | Kate | 1996 | LOC9  | 3           |           | 331791.00 | 3064250.00 |                      |                        | Kuleswor    |                |
| RES    | Kate | 1996 | LOC10 | 3           |           | 331881.00 | 3063610.00 |                      |                        | Balkhu      |                |
| RES    | Kate | 1996 | LOC11 | 3           |           | 330383.00 | 3063080.00 |                      |                        | Kirtipur    |                |
| RES    | Kate | 1996 | LOC12 | 3           |           | 330383.00 | 3063080.00 |                      |                        | Kirtipur    |                |
| RES    | Kate | 1996 | LOC13 | 3           |           | 330383.00 | 3063080.00 |                      |                        | Kirtipur    |                |
| RES    | Kate | 1996 | LOC14 | 3           |           | 331389.00 | 3061210.00 |                      |                        | Chobhar     |                |
| RES    | Kate | 1996 | LOC15 | 3           |           | 333744.00 | 3063730.00 |                      |                        | Kupondole   |                |
| RES    | Kate | 1996 | LOC16 | 3           |           | 333744.00 | 3063730.00 |                      |                        | Kupondole   |                |
| RES    | Kate | 1996 | LOC17 | 3           |           | 333986.00 | 3062740.00 |                      |                        | Pulchok     |                |
| RES    | Kate | 1996 | LOC18 | 3           |           | 333986.00 | 3062740.00 |                      |                        | Pulchok     |                |
| RES    | Kate | 1996 | LOC19 | 3           |           | 333986.00 | 3062740.00 |                      |                        | Pulchok     |                |
| RES    | Kate | 1996 | LOC20 | 3           |           | 333986.00 | 3062740.00 |                      |                        | Pulchok     |                |
| RES    | Kate | 1996 | LOC21 | 3           |           | 333736.00 | 3062220.00 |                      |                        | Jawalakhel  |                |
| RES    | Kate | 1996 | LOC22 | 3           |           | 335494.00 | 3059610.00 |                      |                        | Hatiban     |                |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location     | Material types |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|--------------|----------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE |           |            |                      |                        |              | GEOL_LEG       |
| RES    | Kate | 1996 | LOC23 | 3           |           | 335494.00 | 3059610.00 |                      |                        | Hatiban      |                |
| RES    | Kate | 1996 | LOC24 | 3           |           | 333603.00 | 3066760.00 |                      |                        | Thamel       |                |
| RES    | Kate | 1996 | LOC25 | 3           |           | 335554.00 | 3067970.00 |                      |                        | Baluwatar    |                |
| RES    | Kate | 1996 | LOC26 | 3           |           | 336688.00 | 3069640.00 |                      |                        | Bansbari     |                |
| RES    | Kate | 1996 | LOC27 | 3           |           | 341944.00 | 3070040.00 |                      |                        | Sundarijal   |                |
| RES    | Kate | 1996 | LOC28 | 3           |           | 334361.00 | 3065980.00 |                      |                        | Kamaladi     |                |
| RES    | Kate | 1996 | LOC29 | 3           |           | 334795.00 | 3066340.00 |                      |                        | Hatishar     |                |
| RES    | Kate | 1996 | LOC30 | 3           |           | 334914.00 | 3066340.00 |                      |                        | Kamalpokbari |                |
| RES    | Kate | 1996 | LOC31 | 3           |           | 334914.00 | 3066340.00 |                      |                        | Kamalpokbari |                |
| RES    | Kate | 1996 | LOC32 | 3           |           | 335525.00 | 3066190.00 |                      |                        | Gyaneswor    |                |
| RES    | Kate | 1996 | LOC33 | 3           |           | 335525.00 | 3066190.00 |                      |                        | Gyaneswor    |                |
| RES    | Kate | 1996 | LOC34 | 3           |           | 334633.00 | 3065160.00 |                      |                        | Singhadurbar |                |
| RES    | Kate | 1996 | LOC35 | 3           |           | 334633.00 | 3065160.00 |                      |                        | Singhadurbar |                |
| RES    | Kate | 1996 | LOC36 | 3           |           | 334633.00 | 3065160.00 |                      |                        | Singhadurbar |                |
| RES    | Kate | 1996 | LOC37 | 3           |           | 334633.00 | 3065160.00 |                      |                        | Singhadurbar |                |
| RES    | Kate | 1996 | LOC38 | 3           |           | 336495.00 | 3064320.00 |                      |                        | Baneswor     |                |
| RES    | Kate | 1996 | LOC39 | 3           |           | 336495.00 | 3064320.00 |                      |                        | Baneswor     |                |
| RES    | Kate | 1996 | LOC40 | 3           |           | 336495.00 | 3064320.00 |                      |                        | Baneswor     |                |
| RES    | Kate | 1996 | LOC41 | 3           |           | 336627.00 | 3062560.00 |                      |                        | Koteswor     |                |
| RES    | Kate | 1996 | LOC42 | 3           |           | 340325.00 | 3065650.00 |                      |                        | Gothatar     |                |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location     | Material types |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|--------------|----------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE |           |            |                      |                        |              | GEOL_LEG       |
| RES    | Kate | 1996 | LOC43 | 3           |           | 340325.00 | 3065650.00 |                      |                        | Gothatar     |                |
| RES    | Kate | 1996 | LOC44 | 3           |           | 339676.00 | 3063390.00 |                      |                        | Sanothimi    |                |
| RES    | Kate | 1996 | LOC45 | 3           |           | 339676.00 | 3063390.00 |                      |                        | Hamumante    |                |
| RES    | Kate | 1996 | LOC46 | 3           |           | 339676.00 | 3063390.00 |                      |                        | Hamumante    |                |
| RES    | Kate | 1996 | LOC47 | 3           |           | 339676.00 | 3063390.00 |                      |                        | Hamumante    |                |
| RES    | Kate | 1996 | LOC48 | 3           |           | 341459.00 | 3059870.00 |                      |                        | Suryabinayak |                |
| RES    | Kate | 1996 | LOC49 | 3           |           | 331061.00 | 3064880.00 |                      |                        | Kalimati     |                |
| RES    | Kate | 1996 | LOC50 | 3           |           | 331061.00 | 3064880.00 |                      |                        | Kalimati     |                |
| RES    | Kate | 1996 | LOC51 | 3           |           | 331061.00 | 3064880.00 |                      |                        | Kalimati     |                |
| RES    | Kate | 1996 | LOC52 | 3           |           | 331061.00 | 3064880.00 |                      |                        | Kalimati     |                |
| RES    | Kate | 1996 | LOC53 | 3           |           | 331458.00 | 3065510.00 |                      |                        | Tahachal     |                |
| RES    | Kate | 1996 | T1    | 3           |           | 334531.80 | 3064051.70 |                      |                        | Thapathali   |                |
| RES    | Kate | 1996 | T2    | 3           |           | 334531.80 | 3064051.70 |                      |                        | Thapathali   |                |
| RES    | Kate | 1996 | R1    | 3           |           | 333901.06 | 3065759.89 |                      |                        | Ratnapark    |                |
| RES    | Kate | 1996 | R2    | 3           |           | 333901.06 | 3065759.89 |                      |                        | Ratnapark    |                |
| RES    | Kate | 1996 | R3    | 3           |           | 333901.06 | 3065759.89 |                      |                        | Ratnapark    |                |
| IND    | Bala | 2018 | BH1   | 1           |           | 334743.75 | 3064824.33 | 1290                 | 16                     | Balaju       | Clay, Sand     |
| IND    | Bala | 2018 | BH2   | 1           |           | 334718.35 | 3064827.51 | 1290                 | 16                     | Balaju       | MG, Clay, Sand |
| IND    | Bala | 2018 | BH3   | 1           |           | 334724.70 | 3064858.20 | 1290                 | 16                     | Balaju       | MG, Sand, Clay |
| IND    | Bala | 2018 | BH4   | 1           |           | 334734.23 | 3064884.66 | 1290                 | 16                     | Balaju       | MG, Sand, Clay |

*Table 23 – Database overview (continued)*

| Source | Code | Year | BH_ID | Log quality |           | Easting   | Northing   | Elevation<br>m (MSL) | Final Depth<br>(m bgl) | Location  | Material types          |
|--------|------|------|-------|-------------|-----------|-----------|------------|----------------------|------------------------|---|-------------------------|
|        |      |      |       | LOCA_LOGQ   | LOCA_NATE | LOCA_NATN | LOCA_GL    | LOCA_FDEP            | LOCA_Rem               |   | GEOL_LEG                |
| IND    | Bala | 2018 | BH5   | 1           |           | 334740.58 | 3064915.35 | 1290                 |                        | 16 Balaju                                       | MG, Clay, Sand          |
| IND    | Bala | 2018 | BH6   | 1           |           | 334763.86 | 3064906.89 | 1290                 |                        | 16 Balaju                                       | MG, Clay, Sand          |
| IND    | Bala | 2018 | BH7   | 1           |           | 334753.28 | 3064864.55 | 1290                 |                        | 16 Balaju                                       | MG, Clay                |
| IND    | Bala | 2018 | BH8   | 1           |           | 334758.57 | 3064883.60 | 1290                 |                        | 16 Balaju                                       | MG, Clay, Sand          |
| IND    | Chys | 2015 | BH1   | 1           |           | 335688.33 | 3062629.56 | 1284                 |                        | 12 Chyasal                                      | Sand, Silt              |
| IND    | Chys | 2015 | BH2   | 1           |           | 335688.33 | 3062629.56 | 1284                 |                        | 12 Chyasal                                      | Sand, Silt              |
| IND    | Chys | 2015 | BH3   | 1           |           | 335688.33 | 3062629.56 | 1284                 |                        | 12 Chyasal                                      | Gravel, Silt            |
| IND    | Chys | 2015 | BH4   | 1           |           | 335688.33 | 3062629.56 | 1284                 |                        | 12 Chyasal                                      | MG, Silt                |
| IND    | Chys | 2015 | BH5   | 1           |           | 335688.33 | 3062629.56 | 1284                 |                        | 12 Chyasal                                      | Silt                    |
| R      | JICA | 1990 | JW1   | 2           |           | 334863.74 | 3068411.96 | 1327                 | 246                    |   | Sand, Silt, Clay        |
| R      | JICA | 1990 | JW2   | 2           |           | 336594.16 | 3069933.47 | 1358                 | 230                    |   | MG, Sand, Clay          |
| R      | JICA | 1990 | JW3   | 2           |           | 331619.12 | 3062409.84 | 1280                 | 284.3                  |   | MG, Sand, Clay, Bedrock |
| R      | JICA | 1990 | JW4   | 2           |           | 337759.98 | 3062388.87 | 1295                 | 230                    |   | Clay, Sand              |
| RES    | Dara | 2002 | BH1   | 1           |           | 333698.35 | 3065261.98 | 1299                 |                        | 20 Sundhara Sanchaykosh                         | MG, Clay, Silt, Sand    |
| RES    | Dara | 2002 | BH2   | 1           |           | 333749.15 | 3065431.32 | 1298                 |                        | 20 In front of Royal Nepalese Airlines Building | MG, Clay, Silt, Sand    |
| RES    | Dara | 2002 | BH3   | 1           |           | 333796.78 | 3065624.99 | 1297                 |                        | 20 Khulamanch                                   | MG, Clay, Silt, Sand    |
| RES    | Dara | 2002 | BH4   | 1           |           | 333683.54 | 3065807.03 | 1300                 |                        | 20 Mahabaudha                                   | MG, Clay, Silt          |
| RES    | Dara | 2002 | BH5   | 1           |           | 333836.99 | 3065942.49 | 1300                 |                        | 20 Jamal  | MG, Clay, Silt, Sand    |
| RES    | Pagl | 2018 | BH1   | 1           |           | 334090.46 | 3062663.79 | 1325                 |                        | 16 Pulchowk                                     | Silt, Sand              |