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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS	
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER 30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>		WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE (ALSO POORLY GRADED). GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 2.5 cm PER 50 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:		ALLUVIUM (ALLUV.) - SOILS WHICH HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N) OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING		ROCK HARDNESS	
GENERAL CLASS. GRANULAR MATERIALS (>35% PASSING #200) SILT-CLAY MATERIALS (>35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)		FRESH VERY SLIGHT (V. SLI.) SLIGHT (SLI.) MODERATE (MOD.) SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V. SEV.) COMPLETE	
GROUP CLASS. A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-3 A-4, A-5 A-6, A-7		COMPRESSIBILITY SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 2.5 cm. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. ALL ROCKS EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
SYMBOL		PERCENTAGE OF MATERIAL ORGANIC MATERIAL GRANULAR SILT-CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE		COASTAL PLAIN SEDIMENTARY ROCK (CP)		PERCHED WATER (PW) SPRING OR SEEPAGE	
% PASSING #10 #40 #200		GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING. STATIC WATER LEVEL AFTER 24 HOURS. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE		MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRED SOIL BOUNDARIES INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL	
LIQUID LIMIT PLASTIC INDEX GROUP INDEX		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
USUAL TYPES OF MAJOR MATERIALS		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
GEN. RATING AS A SUBGRADE		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
CONSISTENCY OR DENSENESS		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (kN/m <sup>2</sup> )		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
TEXTURE OR GRAIN SIZE		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
U.S. STD. SIEVE SIZE OPENING (MM)		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F, SD.) SILT (SL.) CLAY (CL.)		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
GRAIN SIZE		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
SOIL MOISTURE - CORRELATION OF TERMS		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
PLASTIC RANGE (PI) LIQUID LIMIT PLASTIC LIMIT OPTIMUM MOISTURE SHRINKAGE LIMIT		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
PLASTICITY		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
COLOR		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
EQUIPMENT USED ON SUBJECT PROJECT		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
DRILL UNITS: MOBILE B-47 BK-51 CME-45 B CME-550 PORTABLE HOIST OTHER OTHER		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
ADVANCING TOOLS: CLAY BITS 152 mm CONTINUOUS FLIGHT AUGER 203 mm HOLLOW AUGERS HARD FACED FINGER BITS CASING w/ ADVANCER TRICONE .75 mm STEEL TEETH TRICONE mm TUNG-CARB. CORE BIT OTHER		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
HAMMER TYPE: AUTOMATIC MANUAL		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
CORE SIZE: B N H		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
FRACTURE SPACING		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
TERM SPACING		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
BEDDING		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
TERM THICKNESS		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
INDURATION		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
FRIABLE MODERATELY INDURATED INDURATED EXTREMELY INDURATED		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
APPROXIMATE FLOOD PLAIN LIMITS		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
ART. FILL LIMITS		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
BENCH MARK:		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
ELEVATION:		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	
NOTES:		MINERALOGICAL COMPOSITION		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS	