



NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES®
sponsored by the National Society of Professional Engineers

Geotechnical Engineering Technology
**CONSTRUCTION, EXPLORATION,
LABORATORY**

PROGRAM DETAIL MANUAL

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Effective upon issuing a new edition of any program detail manual, all previous editions of that program detail manual become obsolete.

This manual may be freely copied in its entirety.

Field Code: 009
Subfield Code: 02, 03, 04

Third Edition
October 2004

IMPORTANT INFORMATION TO ALL CERTIFICANTS AND APPLICANTS

This certification program has undergone several changes since the last printing of the program detail manual in April 1990 (Second Edition). Level I certification as a Technician Trainee is now operational; Level I Student Enrollment is no longer available. Work element #11001, "Basic Metric Units and Conversions," is now mandatory for certification at Level II, III and IV. Two new work elements have been added (Level I General and Level II General) and eight work elements have been deleted. The examination requirements have been changed at Levels II, III and IV.

LEVEL I CERTIFICATION

Becomes operational with Test Cycle 4, 1994. Any person testing Cycle 4, 1994 or after who meets the Level I exam requirement is eligible for certification at Level I. Level I certification will not be awarded retroactively; so persons who met the Level I exam requirement PRIOR to Cycle 4, 1994 are not eligible.

FIRST TIME TESTING

Persons testing in this program for the first time after January 1, 1995 must comply with the *certification requirements as they are written in this manual and on our website (www.nicet.org).

Persons receiving this manual prior to January 1, 1995 may use it immediately.

ALREADY BEGUN TESTING

Persons who had already begun testing in Geotechnical Engineering Technology prior to January 1, 1995 have until July 31, 1995 to complete the requirements as they are written in the 1990 edition. After July 31, 1995, work element #11001 must be passed.

Whenever an exam requirement changes, those persons who are already certified should understand that they do not need to comply with any changes for the level(s) of certification they have already been awarded -- they only have to satisfy the exam requirement for the higher level(s).

In other words, if you are already certified, NICET recognizes you as having met all the exam requirements for that level even if the requirement changes from what it was when you were awarded certification.

*The Certification Requirements consist of:

1. passing an examination requirement;
2. having an approved, current personal recommendation on file;
3. having appropriate work experience for the field/subfield of certification;
4. having approved supervisor signature (verification) for passed work elements;
5. having an approved major project for Level IV certification.

CAUTION

The Institute occasionally makes changes in its certification programs which will significantly affect the currency of individual program detail manuals. These changes could include any or all of the following:

**KEEP YOUR
MANUALS
CURRENT**

- o deletion, modification, or addition of work elements
- o modification to the Examination Requirements Chart
- o modification to the Crossover Work Element Credit Sheet
- o changes to the work experience requirement
- o changes to the verification requirement

Since these changes could affect the requirements for certification, it is highly recommended that you contact the Institute before applying for an examination if this manual is more than a year old. The date of publication of this manual is June 1994. It is the responsibility of all applicants to make sure they are using a current manual.

CHANGES TO THIS MANUAL

This Third Edition of the Geotechnical Engineering Technology manual has been changed from the Second Edition (04-90). The following changes have been made:

- o Work element #11001, "Basic Metric Units and Conversions," is now mandatory for certification at Levels II, III and IV.
- o Level I enrollment has been replaced by Level I certification.
- o The Examination Requirements Charts have been changed.

Once certified, each certificant will be mailed an annual renewal bill. If the yearly payment is not made for three consecutive calendar years, the certification "expires" (all certification records as well as all previous testing records will be deleted) and active certification can be regained only by reapplying as a new applicant and meeting the current criteria.

**PAYMENT OF
ANNUAL RENEWAL
BILL**

Payment of an exam fee does not substitute for payment of the annual renewal fee.

FIELD OF GEOTECHNICAL ENGINEERING TECHNOLOGY
SUBFIELDS OF CONSTRUCTION, EXPLORATION, AND LABORATORY

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GENERAL INFORMATION

This Program Detail Manual contains the information needed to apply for the NICET certification examinations in the Construction, Exploration, and Laboratory subfields of Geotechnical Engineering Technology.

This manual does **not** contain all of the rules and procedures for obtaining certification. For this, you must refer to our website (www.nicet.org).

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in Engineering Technologies (NICET)
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This certification program was designed for technicians engaged in soil investigation and determination of engineering properties prior to and concurrent with initial construction activities. It recognizes, through its three subfields (Construction, Exploration, and Laboratory), situations in which the principal activities of the technician are concentrated in the construction site environment, the exploration operation, or the laboratory environment. The program also recognizes the situation in which the technician routinely has job tasks in all three subfield areas and thus is considered a generalist rather than a specialist. Areas covered include knowledge of standard soil classification tests; specialized laboratory and field tests; construction practices; and recordkeeping and reports.

This program was made operational with the assistance of the California Geotechnical Engineers Association (C.G.E.A.). This work element program replaced a two-part geotechnical certification program that was introduced in 1977 and was discontinued on December 1, 1984.

WORK ELEMENT DESCRIPTIONS

The typical job duties and associated responsibilities of geotechnical technicians have been broken down into discrete work elements which form the basis for an evaluation of the candidate's knowledge. Each work element is written in sufficient detail to permit candidates to make reasonable assumptions about the types of questions likely to be asked.

In addition, the supervisor verifying the experience of the candidate should be able to interpret the scope of the activities associated with each work element.

WORK ELEMENT IDENTIFICATION NUMBERS

In order for NICET to prepare individualized examinations for each applicant, identification numbers have been assigned to each work element. This identification number is normally five digits long.

The first digit identifies the technical subfield within the field of Geotechnical Engineering Technology:

- (1) Construction, Exploration, Laboratory General Work Elements
- (2) All Construction Special Work Elements
- (3) All Exploration Special Work Elements
- (4) All Laboratory Special Work Elements

The second digit identifies the level (Levels I through IV) and the work element type (General or Special):

GENERAL WORK ELEMENTS

- (1) Level I General
- (3) Level II General
- (5) Level III General
- (7) Level IV General

SPECIAL WORK ELEMENTS

- (2) Level I Special
- (4) Level II Special
- (6) Level III Special
- (8) Level IV Special

The third, fourth and fifth digits identify the individual work element within each category. A sample of this numbering

system is illustrated below for work element numbers 13008 and 34013:

1 3 0 0 8

Subfield: 1 (Construction, Exploration, Laboratory)
Level/Type: 3 (Level II General)
Work Element Number: 001

3 4 0 1 3

Subfield: 3 (Exploration)
Level/Type: 4 (Level II Special)
Work Element Number: 013

This five-digit identification number is needed when using the application form to request an examination or provide work element verification.

REQUIREMENTS FOR CERTIFICATION AT LEVELS I THROUGH IV

Level I is designed for entry-level technicians with very limited relevant work experience in the technical subfield. The Institute recommends that persons with eighteen or more months of relevant work experience set their initial certification goal at Level II. Certification at Levels II, III, and IV does **NOT** require prior certification at Level I. The Examination Requirements Charts list the actual examination requirements for certification at Levels I, II, III, and IV in the subfields of Construction, Exploration, Laboratory and Generalist.

WORK ELEMENT SELECTION FOR AN INITIAL EXAM

1. You must select which subfield certification you wish to pursue first. A selection must be made on your initial exam whether to concentrate on work elements applicable to Construction, Exploration, or Laboratory.
2. After the choice of subfield has been made, find the appropriate Examination Requirements Chart on the following four pages in this manual.
3. Select the appropriate box for the level of certification desired.
4. Note the number of work elements required for certification, by category, as shown in the selected box.
5. Turn to the Work Element Listing section and carefully select work elements from the required categories, paying attention at each level to whether they are classified as General or Special work elements. Select first those work elements most likely to be passed. Bear in mind that all General work elements are the same in all three subfields. Once any General work element has been passed on an exam, credit will be given for it in all three subfields.
6. When possible, select a few extra in each category so that failing one or more work elements leaves enough passed work elements to satisfy the examination requirement.
7. If the requirement for the desired level is more than 34, it is advisable to examine first all lower level work elements needed to achieve certification. Save the upper level work elements for a subsequent examination.
8. It is strongly recommended that the maximum number of work elements (34) be selected for each examination taken. Selection of 34 work elements provides the greatest opportunity for successful completion of the examination requirement with the smallest number of subsequent examinations. Recognize, however, that all elements selected on an exam application **WILL BE SCORED**, even if no attempt is made to answer the questions. That is, a score of "0" will

be assigned to the work element even if the questions are not answered and the work element will have one failure marked against it.

9. It is suggested that all examination applicants keep a copy of their filled out applications. This will assist in resolving questions over the telephone.

EXAMINATION REQUIREMENTS CHART

(Subfield: Construction)

You must pass the number of work elements shown in each category to achieve certification at that level.

You must pass this many work elements to achieve certification at Level I

Level I - General - 5
Level I - Special - <u>3</u>
TOTAL 8

You must pass this many work elements to achieve certification at Level II
Note (a)

Level I - General - 8a
Level I - Special - 4
Level II - General - 12
Level II - Special - <u>6</u>
TOTAL 30

You must pass this many work elements to achieve certification at Level III
Notes (a) and (b)

Level I - General - 8a
Level I - Special - 4
Level II - General - 12
Level II - Special - 10
Level III - General - 4
Level III - Special - <u>10</u>
TOTAL 48

You must pass this many work elements to achieve certification at Level IV
Notes (a), (b) and (c)

Level I - General - 8a
Level I - Special - 4
Level II - General - 12
Level II - Special - 15
Level III - General - 4
Level III - Special - 17
Level IV - General - 4
Level IV - Special - 1
TOTAL 65

NOTES:

- (a) Work element #11001 must be passed to satisfy the examination requirement at Levels II, III, and IV.
- (b) Time restrictions dictate that no more than 34 work elements can be scheduled for any single examination sitting. Therefore, at least two examination sittings will be needed in order to complete this requirement.
- (c) Read very carefully the two sections applicable to Level IV certification in this manual before seeking Level IV certification.

GENERAL NOTES:

- (1) Work elements passed which are in excess of the requirement for a particular type and level, but which are needed to meet the requirement at the next higher level are automatically applied to that higher level requirement.
- (2) Use the Personal Tally Worksheet on pages 23 and 24 of this manual to keep track of the number of work elements you have successfully passed.

EXAMINATION REQUIREMENTS CHART

(Subfield: Exploration)

You must pass the number of work elements shown in each category to achieve certification at that level.

You must pass this many work elements to achieve certification at Level I

Level I - General - 5
Level I - Special - 3
TOTAL 8

You must pass this many work elements to achieve certification at Level II
Note (a)

Level I - General - 8a
Level I - Special - 3
Level II - General - 12
Level II - Special - 5
TOTAL 28

You must pass this many work elements to achieve certification at Level III
Notes (a) and (b)

Level I - General - 8a
Level I - Special - 3
Level II - General - 12
Level II - Special - 9
Level III - General - 4
Level III - Special - 8
TOTAL 44

Level I - General - 8a
Level I - Special - 3
Level II - General - 12
Level II - Special - 11
Level III - General - 4
Level III - Special - 12
Level IV - General - 4
Level IV - Special - 4
TOTAL 58

You must pass this many work elements to achieve certification at Level IV
Notes (a), (b) and (c)

NOTES:

- (a) Work element #11001 must be passed to satisfy the examination requirement at Levels II, III, and IV.
- (b) Time restrictions dictate that no more than 34 work elements can be scheduled for any single examination sitting. Therefore, at least two examination sittings will be needed in order to complete this requirement.
- (c) Read very carefully the two sections applicable to Level IV certification in this manual before seeking Level IV certification.

GENERAL NOTES:

- (1) Work elements passed which are in excess of the requirement for a particular type and level, but which are needed to meet the requirement at the next higher level are automatically applied to that higher level requirement.
- (2) Use the Personal Tally Worksheet on pages 23 and 24 of this manual to keep track of the number of work elements you have successfully passed.

EXAMINATION REQUIREMENTS CHART

(Subfield: Laboratory)

You must pass the number of work elements shown in each category to achieve certification at that level.

You must pass this many work elements to achieve certification at Level I

Level I - General - 5
Level I - Special - 3
TOTAL 8

You must pass this many work elements to achieve certification at Level II
Note (a)

Level I - General - 8a
Level I - Special - 4
Level II - General - 12
Level II - Special - 6
TOTAL 30

You must pass this many work elements to achieve certification at Level III
Notes (a) and (b)

Level I - General - 8a
Level I - Special - 4
Level II - General - 12
Level II - Special - 9
Level III - General - 4
Level III - Special - 9
TOTAL 46

You must pass this many work elements to achieve certification at Level IV
Notes (a), (b) and (c)

Level I - General - 8a
Level I - Special - 4
Level II - General - 12
Level II - Special - 12
Level III - General - 4
Level III - Special - 13
Level IV - General - 4
Level IV - Special - 4
TOTAL 61

NOTES:

- (a) Work element #11001 must be passed to satisfy the examination requirement at Levels II, III, and IV.
- (b) Time restrictions dictate that no more than 34 work elements can be scheduled for any single examination sitting. Therefore, at least two examination sittings will be needed in order to complete this requirement.
- (c) Read very carefully the two sections applicable to Level IV certification in this manual before seeking Level IV certification.

GENERAL NOTES:

- (1) Work elements passed which are in excess of the requirement for a particular type and level, but which are needed to meet the requirement at the next higher level are automatically applied to that higher level requirement.
- (2) Use the Personal Tally Worksheet on pages 23 and 24 of this manual to keep track of the number of work elements you have successfully passed.

EXAMINATION REQUIREMENTS CHART

(Subfield: Generalist)

You must pass the number of work elements shown in each category to achieve certification at that level.

You must pass this many work elements to achieve certification at Level I

Level I - General - 5
Level I - Special - 3

TOTAL 8

You must pass this many work elements to achieve certification at Level II

Note (a)

Level I - General - 8a
Level I - Special - 4d
Level II - General - 12
Level II - Special - 9a

TOTAL 33

You must pass this many work elements to achieve certification at Level III

Notes (a) and (b)

Level I - General - 8a
Level I - Special - 4d
Level II - General - 12
Level II - Special - 18e
Level III - General - 4
Level III - Special - 12e

TOTAL 58

You must pass this many work elements to achieve certification at Level IV

Notes (a), (b) and (c)

Level I - General - 8a
Level I - Special - 4d
Level II - General - 12
Level II - Special - 18e
Level III - General - 4
Level III - Special - 27e
Level IV - General - 4
Level IV - Special - 7f

TOTAL 84

NOTES:

- (a) Work element #11001 must be passed to satisfy the examination requirement at Levels II, III, and IV.
- (b) Time restrictions dictate that no more than 34 work elements can be scheduled for any single examination sitting. Therefore, at least two examination sittings will be needed in order to complete this requirement.
- (c) Read very carefully the two sections applicable to Level IV certification in this manual before seeking Level IV certification.
- (d) Can be any **Level I Special** (disregard subfield category.) **Crossover work elements can only be counted once.**
- (e) **Level II and III Special** work elements must be divided equally among the 3 subfield categories of Construction, Exploration, and Laboratory. **Crossover work elements can only be counted once.**

- (f) **Level IV Special** work elements must be distributed as follows: 1 from Construction, 3 from Exploration and 3 from Laboratory. **Crossover work elements can only be counted once.**

REFER TO THE GENERAL NOTES WHICH ARE AT THE BOTTOM OF PAGES 3, 4, AND 5.

WORK ELEMENT SELECTION FOR ALL SUBSEQUENT EXAMS

All the items listed above for the initial examination apply to subsequent exams. In addition, the following should be understood:

1. It is not necessary to retest work elements which were failed on an earlier examination if there are other work elements in the appropriate categories which can be selected instead. If you do retest a failed work element, you will be blocked from signing up a fourth time if it has been previously failed three times. For further information, read the section on repeating failed work elements in Section IV of the general information booklet.
2. If an adequate number of work elements has been selected to meet the certification requirement (with a few extra selected to provide a cushion), and there is room on the exam application to add more elements, it is appropriate to include work elements that will satisfy the examination requirement of the next level of certification or to include work elements from another subfield or another field.

CROSSOVER WORK ELEMENTS

NICET makes every effort to identify work elements in a subfield that are identical or virtually identical in coverage and intent to work elements in one or more other fields/subfields. Once such a work element is passed on an examination it does not normally have to be taken again on any other examinations. Such work elements are classified as crossover work elements.

Crossover work elements within a technical field which are passed on an examination are automatically credited to all subfields within that field. The recognized crossovers within the field of Geotechnical Engineering Technology are listed together in the Work Element Listing section of this manual. In addition, the crossover work elements are identified on the "Personal Tally Worksheet" in this manual.

It is not permitted to sign up for crossover work elements on the same exam, using different numbers. (If you sign up for work elements 24006 and 34006 on the same exam, you will only get one of them -- this is because they are identical.)

Some NICET certification programs permit crossover work element credit among different technical fields. Contact the NICET office by phone or mail to request the field-to-field Crossover Listing for Geotechnical Engineering Technology. You may use this listing to request crossover credit to other fields. In the Geotechnical program, field-to-field crossover credit will be given for work elements in the Construction Materials Testing and the Transportation/Highway Materials programs.

NICET has also developed "generic" work elements which are treated as crossover work elements among almost all of our certification programs. These generic work elements cover communication skills, math, physical science and other basic areas of knowledge which should be known by all engineering technicians. Call NICET to request a copy of the "Generic Work Element Crossover Credit Listing" if you have taken any previous exams and have passed any of these generic work elements. The generic crossover work elements are identified in the Work Element Listing by the symbol (^) after the work element title.

VERIFICATION OF WORK ELEMENTS

Verification should be provided by the applicant's immediate supervisor. The verifier, by signing his or her initials, is

signifying that the applicant has actually performed at least the operations indicated in the work element description and that the verifier is confident that the applicant has performed the specific job tasks **repeatedly and satisfactorily**. Exposure to a job task through demonstrations by others or through partial involvement by the applicant should not be a basis for a supervisor to verify that the task can be performed correctly by the candidate under a variety of conditions.

WARNING

NICET takes very seriously the role of the verifier. All certification candidates and their verifiers must understand that verification is an important component of the certification process.

NICET's Policy #2, "Handling of Certification Process Irregularities" says, in part, that if NICET determines that any verification was obtained from a non-qualified verifier or was given for tasks not actually performed, the NICET action against the candidate can be to permanently deny the certification sought or revoke the certification(s) held. The NICET action against the verifier can be to terminate the privilege of serving as a verifier. If the verifier is NICET-certified, the certification(s) could be revoked.

Lack of verification on any (or all) work elements does not prevent an applicant from testing those work elements. Certification, however, will not be awarded until all work elements counted toward certification are verified.

WORK EXPERIENCE REQUIREMENT

A preponderance of the work experience must be acquired while residing in the United States and its territories, employing U.S. standards and practices.

NICET certification is only conferred upon persons performing engineering technician level work. NICET will not certify persons performing higher level work (such as engineering) or lower level work (such as craft).

LEVEL IV WORK EXPERIENCE REQUIREMENT

In addition to the normal work experience information requested on the technician application form, all candidates for certification at Level IV, Senior Engineering Technician, in Geotechnical Engineering Technology must establish, in writing, that they have occupied a senior position of responsibility on at least one major geotechnical construction project. It must be remembered that ten years or more of employment in the technical area, by itself, is not sufficient for the granting of a Level IV certification.

The writeup sent to NICET must provide a detailed, concise description of a geotechnical project which shows the candidate's recent involvement in a majority of the various aspects of geotechnical construction work. The pertinent work experience must be described in depth by the candidate personally -- official job descriptions or testimonials from others will not be evaluated.

The writeup on each activity/project should include such information as:

- 1. the type of project:**
 - a. earthwork -- embankment, excavating**
 - b. supporting structures -- foundations, piling, retaining walls**
 - c. drainage works -- surface and/or groundwater control**
- 2. scope of project:**
 - a. contract time period, contract value, your time period on the project, the project components**
- 3. the supervisory responsibilities and on-site authority;**
- 4. the range of experiences on the project including, but not limited to reports, recordkeeping at meetings, schedule monitoring, quality assurance, new construction, and rehabilitation.**

Your documentation must address the Level IV requirement that your level of responsibility demonstrates independent engineering technician work, including delegated responsibilities and duties for which engineering precedent exists.

In order to avoid lengthy delays in processing your Level IV certification, this documentation should be sent with the Level IV examination application.

EARLY TESTING OF LEVEL IV WORK ELEMENTS

Although NICET does permit testing of Level IV work elements prior to satisfying the work experience requirement, the Institute reserves the right to question the validity of Level IV work elements passed by, and verified for, persons with little work experience. If, for example, a technician with a total of 3 years of experience passes Level IV work elements, NICET may require documentation of how this higher level knowledge was obtained without accumulating the requisite work experience.

If documentation is inadequate, NICET may require specific work elements to be tested and passed again, at the candidate's expense, at the time of the Level IV certification decision.

In addition, NICET reserves the right to require reverification of work elements designated for meeting the Level IV examination requirement if the verifications were signed three years prior to the time of the Level IV certification decision.

PREPARATION FOR TESTING

As NICET exam questions are written for individuals who routinely perform the job tasks assigned to the certification program, preparation for this examination should be minimal.

SUPPORT MATERIALS FOR TESTING

The exam is open book; therefore bringing standards, references, or textbooks to the exam is permitted. When appropriate, the work element description is rather specific in mentioning applicable standards or procedures.

When work elements are keyed directly to specific industry-wide standards, they will be identified by a normally used notation at the end of the work element description. For testing purposes, the current version of standards shall be the most recent edition, provided the edition was published at least one year prior to the date of testing.

Additionally, when a specific publication is used as an authoritative source in writing the work element questions, the title will be listed at the end of the work element. Refer to the "Selected General References" in this manual for publisher information.

TRAINING COURSES

NICET does not endorse, certify, or accredit training programs and any claims to that effect should be viewed with caution. NICET does, however, provide information on the certification procedures and objectives so that training courses can be developed specifically to help persons planning to take a NICET certification exam.

In order to avoid lengthy delays in processing the Level IV certification, this documentation should be provided with the Level IV examination application.

WORK ELEMENT LISTING

Subfields of Construction, Exploration, Laboratory

LEVEL I - GENERAL WORK ELEMENTS

(Work at Level I Should Be Performed Under Direct Supervision)

All General Work Elements are common to all three subfields of Construction, Exploration, and Laboratory. Each General Work Element ID No. begins with the digit one (1). All General Work Elements which are passed will be posted to all three subfields.

ID No. **Work Element Title and Description**

CORE WORK ELEMENT (See Note 1)

11001 BASIC METRIC UNITS AND CONVERSIONS (^)
 Understand basic metric (SI) units and perform conversions to and from metric units. (E380)

NON-CORE WORK ELEMENTS

- 11002 BASIC MATHEMATICS (^)
 Solve mathematical problems requiring simple addition, subtraction, multiplication, and division. Round to the correct number of significant figures, calculate percentages, read graphs, and use simple geometric definitions and formulas. (See general mathematics textbooks.)
- 11003 BASIC COMMUNICATION SKILLS (^)
 Use proper punctuation, vocabulary, spelling, and sentence structure. Follow written instructions.
- 11004 TERMS AND DEFINITIONS
 Know the standard definitions of soil and rock terms as defined by ASTM. (D653)
- 11005 BASIC PHYSICAL SCIENCE (^)
 Recognize constants, definitions, symbols, and terminology in common use in the application of chemistry, geology, and physics to Geotechnical Engineering Technology. Understand fundamental laws and principles. (References: general physics, general chemistry, and basic geology textbooks.)
- 11006 HANDLING AND STORING SOIL SAMPLES
 Know the proper methods of handling, labeling and storing bulk soil samples. (D420)
- 11007 MOISTURE CONTENT DETERMINATION
 Perform moisture content tests. (D2216)
- 11008 BASIC SOIL CLASSIFICATION
 Perform visual/manual classification of soils in the field and laboratory. (D2488)
- 11009 UNIT WEIGHT TESTS
 Perform direct measurement unit weight tests of cylindrical samples.
- 11010 BASIC INDIVIDUAL SAFETY (^) (**new work element - 1994**)
 Follow standard safety practices in performing job tasks. Recognize and call attention to improper safety practices at the work site. (OSHA 2202)

Note 1: General work elements can be categorized as either Core or non-Core. Work element #11001, "Basic Metric Units and Conversions", is mandatory for certification at Levels II, III and IV. It is the only Core work element in this program at this time.

(^) Indicates that generic crossover credit exists in other fields/subfields for this work element. Contact the Institute to obtain a copy of the "Generic Work Element Listing."

LEVEL I - SPECIAL WORK ELEMENTS

(Work at Level I Should Be Performed Under Direct Supervision)

*******CROSSOVER WORK ELEMENTS*******

In the Special Work Element listing, an initial digit of 2 indicates the Construction subfield, an initial digit of 3 indicates the Exploration subfield, an initial digit of 4 indicates the Laboratory subfield. When a work element has more than 1 number listed, it means that it is a crossover work element and credit will be given in each subfield listed.

On your exam application, only list the first number. Pages 23 and 24 list all the crossovers.

22001(Const) -- 42001(Lab)

REDUCE ROUTINE TEST DATA

Mathematically reduce test data and present basic test results both numerically and graphically.

22002(Const) -- 32001(Expl)

TOPOGRAPHIC MAPS AND SITE PLANS

Use topographic maps and site plan drawings to locate sample sites and determine drainage patterns. Determine grid coordinates, stationing, elevations, offsets and bearings.

22003(Const) -- 32002(Expl)

BORING LOGS AND BORING LOCATION PLANS

Read and interpret boring log symbols and descriptions and location plans.

22004(Const) -- 42002(Lab)

SOIL MOISTURE-DENSITY RELATIONSHIP

Perform moisture-density relationship test (Proctor density). (D698, D1557)

22005(Const) -- 42003(Lab)

SIEVE ANALYSIS/AGGREGATES

Determine and record the particle size distribution of fine and coarse aggregate by sieving. (T27, C136)

22006(Const) -- 32005(Expl) -- 42005(Lab)

TEST SAMPLE (SOIL) PREPARATION

Know the proper techniques for preparing soil samples for testing to include adequate sample size, splitting techniques, and moisture conditioning. (T87, T146, D421, D2217)

32004(Expl) -- 42004(Lab)

SOIL SAMPLING I

Know the techniques used to obtain bulk samples, block samples, SPT samples, and thin walled Shelby Tube samples. (D-420, D-1586, D-1587, D-4220)

*******NON-CROSSOVER WORK ELEMENTS*******

EXPLORATION

32003 STANDARD EXPLORATION EQUIPMENT

Know and understand the uses of commonly-used exploration equipment such as hand-operated motorized boring machines, seismic or resistivity equipment.

LABORATORY

- 42006 WASH TEST FOR SOILS
Use wash test to determine the amount finer than No. 200 sieve in a soil sample. (D1140)
- 42007 STANDARD LAB EQUIPMENT
Be familiar with equipment, devices, scales, ovens, moisture chambers, strain gauges etc. commonly used in the laboratory.

LEVEL II - GENERAL WORK ELEMENTS

(Work at Level II Should Be Performed Under General Supervision)

All General Work Elements are common to all three subfields of Construction, Exploration, and Laboratory. Each General Work Element ID No. begins with the digit one (1). All General Work Elements which are passed will automatically be posted to all three subfields.

- 13001 OSHA AND OTHER SAFETY REGULATIONS
Understand what is needed to comply with OSHA, organizational, state and local safety requirements. Recognize violations and report violations to project engineer. (OSHA 2207)
- 13002 BUSINESS COMMUNICATIONS (^)
Use the rules of syntax and style to write clear sentences and paragraphs in preparing routine correspondence and reports. Follow standard business communications procedures. (See basic grammar and writing handbooks.)
- 13003 STANDARD GEOTECHNICAL TERMS
Know the standard geotechnical terms.
- 13004 INTERMEDIATE MATHEMATICS (^)
Perform mathematical calculations utilizing basic algebra (fundamental laws, algebraic expressions), geometry, and the trigonometric functions of right triangles. (See basic textbooks on algebra and trigonometry.)
- 13005 INTERMEDIATE PHYSICAL SCIENCE (^)
Solve problems in mechanics, electricity, heat, and inorganic chemistry. (Solutions may involve algebra and trigonometry.)
- 13006 ACTIVITY NOTES AND REPORTS
Prepare accurate and detailed laboratory and field notes and reports.
- 13007 TEST RESULTS
Review test results to see if they contain all required information and a reasonably unbiased estimate of the information desired. Compare results with conclusions determined under similar circumstances in the same area working with the same or similar materials. Review procedures used and determine if results properly utilize data collected. Reconcile apparent divergences from standard results.
- 13008 TEST DATA PROCESSING
Compute, record, handle and file test information in accordance with a good standard procedure.
- 13009 SOILS CLASSIFICATION
Classify soils in accordance with the Unified Soil Classification System and the AASHTO Soil Classification System. (M-145, D-2487, D-3282)
- 13010 SOIL PROFILES
Assist in the preparation of generalized soil profiles in the office or the field.

- 13011 SOIL WEIGHT-VOLUME RELATIONSHIPS
Calculate basic soil weight-volume relationships. (See basic soil mechanics textbooks.)
- 13012 POCKET PENETROMETER AND POCKET VANE TESTS
Perform pocket penetrometer test and pocket vane (Torvane) test.
- 13013 EQUIPMENT AND INSTRUMENTS
Care for, clean, perform basic calibrations, and safeguard standard lab and field equipment and instruments.
- 13014 FIRST AID PROCEDURES (^) (**new work element - 1994**)
Understand the basic rules and procedures of first aid. (See general handbooks on first aid.)

LEVEL II - SPECIAL WORK ELEMENTS

*** * * * * CROSSOVER WORK ELEMENTS * * * * ***

In the Special Work Element listing, an initial digit of 2 indicates the Construction subfield, an initial digit of 3 indicates the Exploration subfield, an initial digit of 4 indicates the Laboratory subfield. When a work element has more than 1 number listed, it means that it is a crossover work element and credit will be given in each subfield listed. On your exam application, only list the first number. Pages 23 and 24 list all the crossovers.

24001(Const) -- 34001(Expl)

STANDARD PLANS AND SPECIFICATIONS

Read, interpret, and utilize standard plans and specifications, such as site, grading and utility plans.

24002(Const) -- 34002(Expl)

BASIC SURVEYING AND DRAFTING

Perform planimetric surveys, showing the location of sample sites and recognizable features. Draft plans and location diagrams in accordance with standard practices to permit clear understanding of sampling locations. Key work to topographic maps or plans used on projects.

24003(Const) -- 34003(Expl)

GEOTECHNICAL REPORTS AND PROPOSALS

Have a comprehensive understanding of the requirements of geotechnical reports and the desired results of an engineering/geotechnical proposal.

24004(Const) -- 34004(Expl)

LOCATING UTILITIES

Know where to find the necessary information to locate utilities in the field.

24005(Const) -- 34005(Expl)

MEASURE ELEVATIONS

Determine elevations in the field using only hand level and tape or range poles.

24006(Const) -- 34006(Expl)

MONITOR GROUNDWATER LEVELS

Monitor groundwater levels in boreholes and observation wells.

24010(Const) -- 34007(Expl)

PRELIMINARY CLASSIFICATION OF SOILS

Perform basic classification of soil samples obtained in field.

24012(Const) -- 44008(Lab)

UNCONFINED COMPRESSIVE STRENGTH TESTS

Perform unconfined compressive strength tests in the field or laboratory. (D2166)

24013(Const) -- 44012(Lab)

PLASTIC FINES BY SAND EQUIVALENT TEST

Determine the relative proportions of fine dust or claylike materials in soils or graded aggregates by the Sand Equivalent test. (T176, D2419)

24014(Const) -- 44013(Lab)

MOISTURE-DENSITY RELATIONS/SOILS

Determine the relation between moisture content and density of soils by use of the Standard Proctor and Modified Proctor tests. (T99, T180, T224, D698, D1557)

24019(Const) -- 44014(Lab)

MOISTURE-DENSITY RELATIONS OF SOIL-CEMENT MIXTURES

Determine the relationship between the moisture content and the density of soil-cement mixtures when compacted before cement hydration. (T134, D558)

24020(Const) -- 34015(Expl) -- 44016(Lab)

REAGENTS

Know the reagents used for common field and lab tests. Know limitations on use of reagents and how results are affected.

24022(Const) -- 34016(Expl) -- 44018(Lab)

BASIC DRAFTING (^)

Recognize and describe standard manual drafting techniques. Describe the characteristics and proper usage of standard drafting equipment. (See basic technical drawing textbooks.)

*** * * *NON-CROSSOVER WORK ELEMENTS* * * ***

CONSTRUCTION

24007 GRADING OPERATIONS

Know the various potential construction problems that may occur during a grading operation; i.e., the effect of property line conditions, off-site structures, off-site soil conditions, existing underground structures, etc.

24008 EARTHWORK PROJECTS

Know the special preparations that may be required prior to or during a major earthwork project because of subdrains, culverts, natural gas venting, organic materials, keys in soil or rock, etc.

24009 GRADE STAKES AND CONSTRUCTION SURVEYING

Understand the various types of temporary survey monuments and temporary survey aids set up during a construction project.

24011 SOIL PLACEMENT

Know the soil preparation techniques and equipment for placing and compacting soil on a grading project.

24015 FIELD DENSITY BY SAND CONE METHOD

Determine the in-place moisture content and dry density of soils using the Sand Cone Method. (T191, D1556)

24016 FIELD DENSITY BY RUBBER BALLOON METHOD

Determine the in-place moisture content and dry density of soils using the Rubber Balloon Method. (T205, D2167)

24017 FIELD DENSITY BY DRIVE CYLINDER METHOD

Determine the in-place moisture content and dry density of soils using the Drive Cylinder Method. (T204, D2937)

- 24018 NUCLEAR METHODS
Determine the density and moisture content of soil and soil-aggregate in-place using nuclear equipment. Be familiar with safety precautions and all applicable government regulations. (D2922, D3017)
- 24021 SUBGRADE AND BASE PREPARATION FOR PAVING
Know the general requirements and specifications for subgrade and base preparation for paved areas.

EXPLORATION

- 34008 SOIL SAMPLING II
Know how obtain soil samples by use of the Ring sampler, Denison type sampling, Osterberg sampler, SPT.
- 34009 APPLICATION OF SOIL SAMPLING METHODS
Know the conditions which dictate specific soil sampling procedures in the field.
- 34010 FIELD LAYOUT OF BORINGS
Lay out boring locations under field conditions using only chain (or tape) and range poles.
- 34011 FIELD LOG OF BORINGS
Prepare accurate field logs of borings and test pits.
- 34012 SOIL AUGERING METHODS
Understand the field use of Solid Stem, Hollow Stem, hand auger, bucket type rig or large diameter auger.
- 34013 ROCK DRILLING
Understand the field use of air drilling procedures and diamond/carbide coring of hard and soft rocks.
- 34014 ROTARY DRILLING AND WASH BORING PROCEDURES
Know rotary and wash boring techniques, including use of bits, drill fluids, casing, driving, etc.

LABORATORY

- 44001 LABORATORY DATA
Prepare laboratory standard test data and curves for presentation.
- 44002 LABORATORY TEST DESCRIPTIONS
Read and understand standard laboratory test descriptions as specified by ASTM, AASHTO, and others.
- 44003 LIQUID AND PLASTIC LIMITS
Determine the liquid and plastic limits of soils and derive the Plasticity Index from the data obtained. (T89, T90, D4318)
- 44004 PARTICLE-SIZE ANALYSIS OF SOILS
Determine the quantitative distribution of particle sizes in a soil sample. (T88, D422)
- 44005 CBR OF LAB COMPACTED SOILS
Determine the bearing ratio of soil when compacted and tested in the laboratory by comparing the penetration load of the soil to that of a standard material. (T193, D1883)
- 44006 SPECIFIC GRAVITY/SOILS
Determine the specific gravity of a soil sample by means of a pycnometer. (T100, D854)
- 44007 RELATIVE DENSITY
Determine minimum and maximum index density of cohesionless soils in the laboratory. (D4253-4254)
- 44009 UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTS
Perform unconsolidated-undrained triaxial compression tests (no pore pressure measurements) in the laboratory. (D2850)

- 44010 LOSS ON IGNITION TESTS
Perform loss on ignition tests.
- 44011 PERMEABILITY TESTS
Perform routine permeability tests of granular soils in the laboratory. (D2434)
- 44015 WIRE CLOTH SIEVES
Use sieves for testing purposes. (E11, M92)
- 44017 SHRINKAGE FACTORS OF SOILS
Determine the following soil constants: shrinkage limit, shrinkage ratio, volumetric shrinkage, and linear shrinkage. (T92, D427)

LEVEL III - GENERAL WORK ELEMENTS

All General Work Elements are common to all three subfields of Construction, Exploration, and Laboratory. Each General Work Element ID No. begins with the digit one (1). All General Work Elements which are passed will automatically be posted to all three subfields.

- 15001 DAILY OBSERVATIONS AND SUMMARY REPORTS
Review daily reports of observations and prepare summary reports for submittal to supervising engineer.
- 15002 GEOTECHNICAL LITERATURE
Review geotechnical literature for pertinent data for use in analysis, reports, or field operations.
- 15003 GEOLOGY
Demonstrate comprehension of basic geology through an understanding of pertinent data for use in analysis, reports, or field operations.
- 15004 INTERNAL RELATIONS
Establish effective and proper working relations within the company.
- 15005 TECHNICAL PRESENTATIONS AND REPORTS (^)
Organize and deliver oral presentations and prepare technical reports and correspondence.
- 15006 WORK ELEMENT DELETED. Credit retained by those who previously passed it.
- 15007 SUPPLIES AND EQUIPMENT
Keep accurate inventories of supplies, equipment and property records.

LEVEL III - SPECIAL WORK ELEMENTS

******* CROSSOVER WORK ELEMENTS *******

In the Special Work Element listing, an initial digit of 2 indicates the Construction subfield, an initial digit of 3 indicates the Exploration subfield, an initial digit of 4 indicates the Laboratory subfield. When a work element has more than 1 number listed, it means that it is a crossover work element and credit will be given in each subfield listed. On your exam application, only list the first number. Pages 23 and 24 list all the crossovers.

- 26003(Const) -- 36002(Expl)**
CBR TESTS
Perform field CBR tests in the field. (D4429)

26004(Const) -- 36003(Expl)

INSTRUMENTED STATIC LOAD TESTS

Monitor instrumented static load tests under direction of engineer or senior level technician.

26005(Const) -- 36004(Expl)

EARTH STRAIN GAUGES

Monitor earth strain gauges.

26006(Const) -- 36005(Expl)

SETTLEMENT OF FOUNDATIONS OR EMBANKMENTS

Monitor vertical and lateral deflection of foundations or embankments.

26007(Const) -- 36006(Expl)

PORE PRESSURES

Monitor pore pressures in the field.

26008(Const) -- 36007(Expl)

VIBRATION MONITORING

Perform vibration monitoring.

26009(Const) -- 36008(Expl)

INCLINOMETERS

Monitor inclinometers.

26011(Const) -- 36009(Expl)

GROUNDWATER CONDITIONS

Recognize changed groundwater conditions in the field.

26016(Const) -- 46011(Lab)

BASIC STATISTICS

Apply basic statistical concepts related to probability, frequency distributions such as histograms, central tendency measures such as mean and mode, and dispersion measures such as standard deviation. (See elementary statistics textbooks.)

26018(Const) -- 46018(Lab)

GRADED AGGREGATE BASE MATERIALS

Know the specifications for graded aggregate materials for bases or subbases for highways or airports. (D2940)

*******NON-CROSSOVER WORK ELEMENTS*******

CONSTRUCTION

26001 INSTRUMENTS

Maintain routine instruments and test equipment according to manufacturers' instructions.

26002 EARTHWORK QUANTITIES

Compute earthwork quantities in the office, considering loss by shrinkage and other factors.

26010 FIELD OBSERVATIONS OF EXCAVATED FOUNDATION CONSTRUCTION

Perform field observations of foundation construction, including shallow foundations, caissons and bored friction piles.

26012 SUBSURFACE CONDITIONS

Recognize changed subsurface conditions in the field.

- 26013 TIEBACKS AND SOLDIER PILES
Monitor installation and stressing procedures of tied back shoring systems.
- 26014 SPECIAL CONDITIONS DURING GRADING OPERATIONS
Understand and solve various potential construction problems occurring during a grading project.
- 26015 TEMPORARY SUBTERRANEAN CUTS IN SOIL
Monitor, observe and record information during preparation of designed unsupported cuts in soil for temporary subterranean excavations.
- 26017 DEWATERING PROCEDURES
Know common dewatering method monitoring procedures and materials.
- 26019 DRIVEN PILES
Know the recording procedures, observations and general procedural requirements during the installation of various types of driven piles.
- 26020 GEOFABRICS
Know the types, uses and installation of typical polypropylene/nylon fabrics for geotechnical purposes.
- 26021 SUBDRAIN SYSTEMS
Know the types and installation of drainage systems used around structures to relieve fluid pressure.
- 26022 EROSION OF NATURAL AND FILL SLOPES
Know the basic requirements for surface drainage systems, surface preparation, and planting for natural and compacted earth fill slopes.
- 26023 TRENCH BACKFILL COMPACTION
Know the techniques and materials that should be employed to provide proper trench backfill in a variety of conditions.
- 26024 SLOPE REPAIRS
Know the procedures and techniques used in restoring slumped or failed earthen slopes back to a condition similar to that existing prior to the failure.
- 26025 EARTHWORK PROJECT PREPARATIONS
Approve the special preparations that may be required prior to or during a mass earthwork project because of subdrains, culverts, natural gas venting, organic materials, keys in soil or rock, etc.

EXPLORATION

- 36001 INSTRUMENTS
Maintain routine instruments and test equipment according to manufacturers' instructions.
- 36010 FIELD PERMEABILITY TESTING IN SOIL
Perform routine field permeability tests (down-borehole, percolation, doublering infiltration, etc.).
- 36011 FIELD PERMEABILITY TESTING IN ROCK CORED HOLES
Perform down borehole packer testing and pump-in tests in boreholes cored in rock.
- 36012 VANE SHEAR TESTING
Perform vane shear testing in the field. (D2573)
- 36013 PRESSURE METER TESTS
Perform pressure meter testing in the field.
- 36014 DUTCH CONE TEST
Perform cone and friction cone testing in the field. (D3441)

- 36015 DILATOMETER TEST
Perform Dilatometer testing in the field.
- 36016 PLATE BEARING TESTS
Perform plate bearing tests in the field. (D1194, D1195, D1196)
- 36017 SWEDISH FOIL SAMPLER
Obtain samples in cohesive soil by use of the Swedish Foil Sampler.
- 36018 FIELD SOIL-STRUCTURE CORROSION TESTS
Perform soil-structure corrosion tests in the field.

LABORATORY

- 46001 INSTRUMENTS
Maintain routine instruments and test equipment according to manufacturers' instructions.
- 46002 SUPERVISE AND COORDINATE SOIL TESTING
Perform, supervise and coordinate routine soil testing in the laboratory.
- 46003 CONSOLIDATION TESTING
Perform routine consolidation testing in the laboratory. (D2435)
- 46004 SWELL TESTING
Perform swell testing of soil in the laboratory. (D3877)
- 46005 DIRECT SHEAR TESTING
Perform simple direct shear testing in the laboratory. (D3080)
- 46006 CONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TESTING
Perform consolidated-undrained triaxial compression tests (no pore pressure measurements) in the laboratory. (D4767)
- 46007 FREEZE-THAW TESTING
Perform freeze-thaw testing on compacted soil-cement mixtures in the laboratory. (D560)
- 46008 DISPERSION TESTING
Perform dispersion testing (including pin-hole test) in the laboratory. (D4221, Laboratory Soils Testing)
- 46009 TESTS ON SPECIAL MATERIALS
Perform routine testing on special materials (modified soils, manufactured soils, industrial wastes, etc.) in the laboratory (grain size, CBR, plasticity, unconfined compressive strength, permeability, moisture-density relationship).
- 46010 PERMEABILITY TESTS
Perform recognized methods of laboratory permeability tests on noncohesive and cohesive soils. (D2434)
- 46012 TRIAXIAL COMPRESSION TESTS WITH PORE PRESSURE MEASUREMENTS
Perform triaxial compression and extension tests with pore pressure measurements in the laboratory.
- 46013 ELECTRICAL RESISTIVITY TESTS
Perform electrical resistivity testing in the laboratory.
- 46014 RESISTANCE R-VALUE AND EXPANSION PRESSURE OF COMPACTED SOILS
Test treated and untreated laboratory compacted soils or aggregates with the stabilometer and expansion pressure devices to obtain results indicative of performance when placed in the base, subbase, or subgrade of a road subjected to traffic. (T190, D2844)

- 46015 COMPRESSIVE STRENGTH OF ROCK CORE SPECIMENS
Demonstrate knowledge of the testing procedure to determine the compressive strength of rock core specimens. (D2938)
- 46016 SOIL/LIME MIXTURES
Demonstrate knowledge of soil/lime testing procedures; laboratory preparation, strength, and lime content of soil/lime mixtures. (D3551)
- 46017 COMPACTED SOIL-CEMENT MIXTURES
Determine the soil-cement loss, moisture changes, and volume changes produced by repeated wetting and drying or freezing and thawing of hardened soil-cement specimens. (T135, T136, D559, D560)
- 46019 pH OF SOIL
Know how to use the pH test of a soil to supplement soil resistivity measurements. (G51)
- 46020 WORK ELEMENT DELETED. Credit retained by those who previously passed it.

LEVEL IV - GENERAL WORK ELEMENTS

NOTE: Certification at Level IV requires that the candidate must have occupied a senior position of responsibility throughout the duration of one major geotechnical project. There are no exceptions to this requirement and documentation must be present in the work history listed on the application form.

All General Work Elements are common to all three subfields of Construction, Exploration, and Laboratory. Each General Work Element ID No. begins with the digit one (1). All General Work Elements which are passed will automatically be posted to all three subfields.

- 17001 COMPUTERS
Have a general knowledge of the functions and use of computers and potential uses in the field of engineering.
- 17002 COST AND PERFORMANCE MANAGEMENT
Maintain effective internal management over cost and performance on any project assigned.
- 17003 EXTERNAL WORKING RELATIONS
Establish effective and proper working relations with contractors, subcontractors, suppliers, consultants, utility companies, government agencies, municipalities, property owners, design personnel, and the public.
- 17004 QUALITY ASSURANCE
Perform quality assurance for all direct work or supervised work.
- 17005 QUALITY ASSURANCE DOCUMENTATION
Maintain formal quality assurance documentation for those projects where a QA program is part of the contract.
- 17006 EQUIPMENT CALIBRATION
Calibrate, or direct the calibration of all equipment not requiring tracing to National Bureau of Standards.

LEVEL IV - SPECIAL WORK ELEMENTS

******* CROSSOVER WORK ELEMENTS *******

In the Special Work Element listing, an initial digit of 2 indicates the Construction subfield, an initial digit of 3 indicates the Exploration subfield, an initial digit of 4 indicates the Laboratory subfield. When a work element has more than 1 number listed, it means that it is a crossover work element and credit will be given in each subfield listed. On your exam application, only list the first number. Pages 23 and 24 list all the crossovers.

28001(Const) -- 48005(Lab)

RADIOACTIVE MATERIAL REGULATIONS

Know the general state/federal regulations governing radioactive materials, including documentation, licensing, film badges, wipe tests and knowledge of radioactive hazard in the field relative to low level radiation in nuclear moisture/density gauges and laboratory equipment.

28003(Const) -- 48008(Lab)

DELETED WORK ELEMENT. Credit retained by those who previously passed it.

28004(Const) -- 48006(Lab)

DELETED WORK ELEMENT. Credit retained by those who previously passed it.

*******NON-CROSSOVER WORK ELEMENTS*******

CONSTRUCTION

28002 SOIL STABILIZATION METHODS

Know grouting practices (slurry, chemical and compaction), slurry walls, etc. and observations to be made during field operations.

EXPLORATION

38001 ELECTRICAL RESISTIVITY TESTING IN THE FIELD

As part of a geophysical survey, demonstrate knowledge of electrical resistivity testing in the field.

38002 SURFACE SEISMIC SURVEY

Perform surface seismic survey using multi-channel recorders.

38003 DOWNHOLE (SINGLE) OR CROSS HOLE (MULTIPLE) SEISMIC SURVEYS

As part of a geophysical survey, demonstrate the method for downhole (single) or cross hole (multiple) seismic surveys. (D4428, D4428M)

38004 EXPLORATION EQUIPMENT SELECTION

Aid the engineering staff in the selection of exploration equipment for a variety of project types, soil conditions and geographic locations.

38005 EXPLORATION PROJECTS

Aid the engineering staff in mobilizing drilling projects in various environmental conditions such as isolated geographical areas, residential areas, downtown areas, etc. and discuss the relevant considerations.

- 38006 EXPLORATION EQUIPMENT PURCHASE
Aid the engineering staff in purchasing exploration equipment, taking into consideration the nature of the most common project types, size of the company, and potential overhead, repair costs and back-up personnel required.
- 38007 DELETED WORK ELEMENT. Credit retained by those who previously passed it.
- 38008 DRILL BITS FOR ROCK CORE PROJECTS
Select drill bit types for various rock types and drilling depths and demonstrate basic knowledge of drill bit construction and drill bit life and wear factors.

LABORATORY

- 48001 DYNAMIC TESTING
Perform dynamic testing. (D4015)
- 48002 CONSOLIDATION TESTING
Perform consolidation testing including back pressure saturation.
- 48003 DELETED WORK ELEMENT. Credit retained by those who previously passed it.
- 48004 ROCK MECHANICS TESTS
Perform rock mechanics testing.
- 48007 ELECTRONIC MONITORING EQUIPMENT
Understand electronic monitoring equipment such as transducers, load cells, and read out equipment used, and care and maintenance of such equipment.
- 48009 SUPERVISE SOIL LABORATORY
Select, maintain and calibrate test equipment; select appropriate test to be performed; supervise sampling, testing and reporting for a field soil laboratory. Responsible for all operations under the supervision of an engineer.
- 48010 TRIAXIAL TEST DATA CALCULATIONS II
Calculate and interpret results of consolidated-undrained triaxial compression tests on triaxial compression-tests with pore pressure measurements.

PERSONAL TALLY WORKSHEET

Passed Work Elements in Geotechnical Engineering Technology

ALL GENERAL WORK ELEMENTS/ALL SUBFIELDS

<u>LEVEL I</u>	<u>LEVEL II</u>		<u>LEVEL III</u>	<u>LEVEL IV</u>
___11001	___13001	___13008	___15001	___17001
___11002	___13002	___13009	___15002	___17002
___11003	___13003	___13010	___15003	___17003
___11004	___13004	___13011	___15004	___17004
___11005	___13005	___13012	___15005	___17005
___11006	___13006	___13013	___15006*	___17006
___11007	___13007	___13014	___15007	
___11008				
___11009				
___11010				

ALL LEVEL I SPECIAL WORK ELEMENTS

WORK ELEMENTS WITH NO CROSSOVER CREDIT

<u>CONSTR</u>	<u>EXPLOR</u>	<u>LAB</u>
none	___32003	___42006
		___42007

CROSSOVER WORK ELEMENTS

(Check off all in row once one is passed)

___22001	none	___42001
___22002	___32001	none
___22003	___32002	none
___22004	none	___42002
___22005	none	___42003
	none	___42004
___22006	___32005	___42005

ALL LEVEL II SPECIAL WORK ELEMENTS

WORK ELEMENTS WITH NO CROSSOVER CREDIT

<u>CONSTR</u>	<u>EXPLOR</u>	<u>LAB</u>
___24007	___34008	___44001
___24008	___34009	___44002
___24009	___34010	___44003
___24011	___34011	___44004
___24015	___34012	___44005
___24016	___34013	___44006
___24017	___34014	___44007
___24018		___44009
___24021		___44010
		___44011
		___44015
		___44017

CROSSOVER WORK ELEMENTS

(Check off all in row once one is passed)

___24001	___34001	none
___24002	___34002	none
___24003	___34003	none
___24004	___34004	none
___24005	___34005	none
___24006	___34006	none
___24010	___34007	none
___24012	none	___44008
___24013	none	___44012
___24014	none	___44013
___24019	none	___44014
___24020	___34015	___44016
___24022	___34016	___44018

*work element has been deleted. Credit is retained by those who previously passed it.

LEVEL III SPECIAL WORK ELEMENTS

WORK ELEMENTS WITH NO CROSSOVERS

<u>CONSTR</u>	<u>EXPLOR</u>	<u>LAB</u>
__26001	__36001	__46001
__26002	__36010	__46002
__26010	__36011	__46003
__26012	__36012	__46004
__26013	__36013	__46005
__26014	__36014	__46006
__26015	__36015	__46007
__26017	__36016	__46008
__26019	__36017	__46009
__26020	__36018	__46010
__26021		__46012
__26022		__46013
__26023		__46014
__26024		__46015
__26025		__46016
		__46017
		__46019
		__46020*

CROSSOVER WORK ELEMENTS

(Check off all in row once one is passed)

__26003	__36002	none
__26004	__36003	none
__26005	__36004	none
__26006	__36005	none
__26007	__36006	none
__26008	__36007	none
__26009	__36008	none
__26011	__36009	none
__26016	none	__46011
__26018	none	__46018

LEVEL IV SPECIAL WORK ELEMENTS

WORK ELEMENTS WITH NO CROSSOVERS

<u>CONSTR</u>	<u>EXPLOR</u>	<u>LAB</u>
__28002	__38001	__48001
	__38002	__48002
	__38003	__48003*
	__38004	__48004
	__38005	__48007
	__38006	__48009
	__38007*	__48010
	__38008	

CROSSOVER WORK ELEMENTS

(Check off all in row once one is passed)

__28001	none	__48005
__28003*	none	__48008*
__28004*	none	__48006*

*work element has been deleted. Credit is retained by those who previously passed it.

SELECTED GENERAL REFERENCES*

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Measurement of Soil Properties in the Triaxial Test. A.W. Bishop and D.J. Henkel. Edward Arnold Ltd. London. 1962.

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Site Investigation Practice, M.D. Joyce. E. & F.N. Spon Ltd. London. 1982

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Subsurface Investigation for Design and Construction of Foundations of Buildings. Manual No. 56. American Society of Civil Engineers. New York. 1976.

*This listing is not intended to be complete or representative.

SAMPLE SCORE REPORT

EXAM NO. 000100

APPL. NO. 123/45/6789

1420 King Street, Alexandria, Virginia 22314-2715 / 703-684-2837

Report Date: 11/01/93

Date of Examination: 10/01/93

Examination Field: GEOTECHNICAL ENGINEERING TECHNOLOGY

WORK ELEMENT 2/6/019 DRIVEN PILES	70.75	PASS
WORK ELEMENT 2/6/020 GEOFABRICS	80.00	PASS
WORK ELEMENT 2/6/021 SUBDRAIN SYSTEMS	35.00	FAIL
WORK ELEMENT 2/6/022 EROSION OF NATURAL & FILL SLOPES	100.00	PASS
WORK ELEMENT 2/6/023 TRENCH BACKFILL COMPACTION	86.00	PASS
WORK ELEMENT 2/6/024 SLOPE REPAIRS	98.00	PASS
WORK ELEMENT 2/6/025 EARTHWORK PROJECT PREPARATIONS	57.00	FAIL
WORK ELEMENT 4/6/001 INSTRUMENTS	72.00	PASS

JOHN DOE
1420 King Street
Alexandria, Virginia 22314-2715