



Natural Resources Conservation Service  
375 Jackson Street, Suite 600  
St. Paul, MN 55101-1854

*Helping People  
Help the Land*

Phone: (651) 602-7900  
Fax: (651) 602-7914

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Transmitted via email

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NATIONAL ENGINEERING MANUAL  
210-V  
AMENDMENT MN26

SUBJECT: ENG – DIRECTIVES – NATIONAL ENGINEERING MANUAL

Purpose. To distribute updated Minnesota Supplements to the National Engineering Manual

Effective Date. This amendment is effective upon receipt.

Remove MN Table of Contents for each Subchapters A thru E. Refer to the Primary Table of Contents located in the front of the manual.

REMOVE PAGES

None-new page

MNi-ii Subchapter A, dated Apr 2002  
MN500-2(1)-(2) dated Apr 2002  
MN501-12(5) thru (10) dated Mar 2004  
MN501-15(1)-(2) dated Jan 1992  
MN501-20(1)-(2) dated Feb 1999  
MN503-2(1)-(2) dated Apr 2000  
MN503-5(1) dated Nov 1991  
MN505-8(1)-(2) dated Feb 1999  
MNi Subchapter B, dated Apr 2002  
MN511-7(1) thru (3) dated Apr 2002  
MN511-11(1) dated Jan 1992  
MN512-12(1) thru (3) dated Feb 1999  
MN512-16(1) dated Feb 1999  
MNi Subchapter C, dated Oct 1999  
MN520-10(1)-(2) dated Mar 1997  
MN520-12c(1)-(2) dated Mar 1992  
MN520-14(7) dated Mar 1985  
MN523-2(1) dated Mar 1992  
MNi Subchapter D, dated Apr 2002  
MN531-17(1) dated Apr 2002  
MN537-1(1)-(2) dated Mar 2004  
MNi Subchapter E, dated Apr 2002  
MN541-10(1)-(2) dated May 1995  
MN542-2(1) dated Jan 1997  
None-New page

INSERT PAGES dated Sept. 2006

MNi after Nat'l Table of Contents  
Page deleted  
MN500-2(1) thru (4)  
MN501-12(5) thru (10)  
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MN531-17(1)  
MN537-1(1)-(2)  
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MN541-7(1)  
MN542-4(1)  
MN542-6(1)

Paper distribution is being made only to the State Office and Area Engineers. For all others, this amendment is available on our website at [www.mn.nrcs.usda.gov/technical/eng/nempolicies.html](http://www.mn.nrcs.usda.gov/technical/eng/nempolicies.html). Field staff should contact their Area Engineer for engineering policy questions.

/s/

WILLIAM HUNT  
State Conservationist

Encls.

DIST: ENG(B)  
ASTC(FO)

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## Subpart A - General

### **MN500.00 General.**

Engineering activities in Minnesota will be provided in accordance with the following guidelines.

(a) Engineering assistance.

(1) The NRCS provides engineering assistance in the form of investigations, planning, design and construction inspection so conservation practices are installed in a sound manner. Proper operation and maintenance of the measures will be outlined with the owner at the time of installation.

(2) Assistance will be given to those individuals and groups in accordance with local priorities as needed to support NRCS programs.

(3) The NRCS will furnish engineering assistance through soil and water conservation districts to:

- Individual land users;
- Groups of land users having a mutual conservation or resource management problem;
- Legally organized groups;
- State, counties, municipalities and other units of government concerned with resource management according to procedures outlined in the NRCS National Planning Procedures Handbook.

(4) The NRCS will plan and design works of improvement only when there is reasonable assurance that they will be constructed as planned. Technical assistance will be withdrawn whenever it is known that specifications are not being followed.

(b) Scheduling Engineering Assistance.

(1) The District Conservationist will submit form MN-MGT-007, "Request for Field Office Support Staff Assistance" (see exhibit MN500.03) to the Assistant State Conservationist (Field Operations) (ASTC(FO)) in duplicate for each job on which engineering assistance is needed. The front side of the request form will be completed by the District Conservationist. This gives the ASTC(FO) and the Area Engineer details concerning the nature of the project, the assistance desired, survey data available, farmer interest, and date assistance is needed. The backside will be completely filled out by the Area Engineer and a copy furnished to the District Conservationist. The District Conservationist will keep the area engineering staff advised by memo whenever there is a change in the priority or target date for construction on approved requests. When the engineering staff is called upon to give assistance to a field office staff while at the field office, or on an emergency basis, a request form should be completed as soon as possible and sent through channels for record purposes.

(2) All requests for state office engineering assistance will be made by the ASTC(FO) to the State Conservationist including but not limited to: training, investigations, design, construction, sedimentation surveys, soil mechanics, and engineering software support.

**500.02 MN Abbreviations.**

ASTC(FO) - Assistant State Conservationist (Field Operations).

Subpart A - General

MN500.3 Exhibit - Request for Field Office Support Staff Assistance

See From MN-MGT-007, Request for Field Office Support Staff Assistance

§MN501.03 Compliance of engineering work with laws and regulations.

(b) NRCS registered professional engineers may seal engineering plans when required by a permitting or funding agency. The need for sealing must be identified during the planning phase to ensure that all work is done under the direction of the responsible professional engineer.

(c) The State Conservation Engineer (SCE) will be notified when any engineering plans prepared by the NRCS will need to be sealed by a licensed Professional Engineer rather than using the agency approval process.

(4) Plans prepared by the NRCS for dams, which require a dam safety permit, must be approved by an NRCS engineer but sealing is not required.

§MN501.04 Engineering technical approval authority (TAA).

(b) Engineering technical approval authority (Classes I thru V)

(2) The practice of engineering is regulated in Minnesota by the Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience and Interior Design (referred to herein as the Registration Board). The Registration Board has determined that "the responsible professional engineer" (for NRCS the SCE) must determine if "the design of a non-hazardous project constitutes the practice of engineering." If it does, the design of that project may only be approved by a professional engineer or a qualified federal employee working within the scope of their employment. All practices marked with an asterisk on the technical approval authority chart have been determined by the SCE to constitute professional engineering practice. In certain circumstances, complicating factors may cause other work to be considered professional engineering practice also.

NRCS Employees

- TAA for Class I to V practices may be delegated to qualified NRCS employees.
- TAA will be recommended by the Area Engineer familiar with that person's abilities. Form MN-ENG-013 (Exhibit §MN501.09) will be used to record the recommendation.
- TAA recommendations for work which is considered professional engineering practice must have the concurrence the SCE.
- TAA will be issued by the employee's administrative supervisor.
- TAA for Area Engineers will be recommended by the SCE.
- Employees must sign the TAA ethics statement on Form MN-ENG-013 before the approval authority is valid.

Soil and Water Conservation District (SWCD) or Joint Powers Area (JPA) Employees

- TAA will be recommended by the NRCS Area Engineer on Form MN-ENG-013 upon request by the SWCD Board. The Area Engineer will obtain input from others as appropriate.
- TAA for SWCD employees who are not registered professional engineers may only include Class I thru V practices which are not considered professional engineering practice.
- TAA for SWCD employees will be assigned by the SWCD Board.
- If the SWCD Board does not agree with the recommended TAA, they can forward it to the Board of Water and Soil Resources Chief Engineer and NRCS SCE for review.

MN501.04(b)(2)

- Employees must sign the TAA ethics statement on Form MN-ENG-013 before the approval authority is valid.
- Other public agency or non-profit employees operating under agreement with the NRCS may receive TAA under this same process.

Licensed Professional Engineers (PEs) Operating under Contribution Agreements

- Licensed PEs operating under Contribution Agreements with the NRCS are considered to have TAA for all work within the scope of their license.
- PEs operating under contribution agreements will be required to certify plans in accordance with NEM 505.03b, Site Specific Plans and Specifications.
- The NRCS review of work submitted by PEs under contribution agreements will be limited to that described in NEM 505.03 (b)(3).

Filing

Copies of TAA forms and charts will be maintained by the employee and the recommending engineer. TAA should be reviewed annually and revised as necessary.

Project Design

Employees are encouraged to work on certain phases of projects that exceed their approval level under the guidance and technical supervision of more experienced employees with the proper TAA.

It is not necessary or practical for the person with TAA to perform all the steps leading to a complete job. It is expected that employees without TAA will carry out functions (survey, design drafting, etc.) as far as their knowledge and abilities will permit.

All engineering designs will be checked for accuracy. This should be done by someone other than the one preparing them if possible. Staff in one-person field offices can check their own work on Class I and II projects.

Technical approval for engineering projects must be indicated with the signature, title, and date of signature being placed upon the engineering plans, investigation report, construction records or other supporting data.

Construction Changes

Significant changes to engineering plans must be approved by the person who approved the original design. If this approval is done verbally, this conversation must be documented in the file. Significant changes may also require approval from permitting authorities such as the Minnesota Pollution Control Agency for feedlot plans.

(c) Designs for Class VI to Class VIII jobs will be coordinated with the SCE individually. A design review and approval process specific to the job that is in accordance with policy and sound engineering practice will be used.

(f) At the time that engineering plans are delivered to a cooperator, an approval statement must be signed and dated by the cooperator. Required wording for this cooperator approval statement is:

MN501-12(2)

**I have reviewed and understand the plans and specifications and agree to complete the work accordingly. Failure to meet these plans and specifications may jeopardize any cost share applied for. I understand that it is my responsibility to secure all necessary permits and licenses, and to complete the work in accordance with all local, state, and federal laws. Modification of these plans or specifications must be approved by the Natural Resources Conservation Service before installation. I assume responsibility for negotiations and agreements with the contractors.**

Except as described below, this statement must be on the first page of engineering drawings.

For simple plans that do not use CAD drawings, this statement may be included on a separate sheet instead of having it on the drawings. If separated, the cooperators' approval must include a reference to the plan it is being signed for, and must be kept in the cooperators' file.

§MN501.05 Engineering job review.

(b) Post Reviews.

(1) Engineers on the area staff will review at least 5 percent of Class I, II and III jobs approved by area and field office personnel each year. The State Conservation Engineer (SCE) will review at least 5 percent of the Class IV and V jobs approved by area/field office personnel each year. The Area Engineer is to send the SCE a summary list of jobs in this category by October 1 for the jobs that were designed and/or constructed during the past year. The SCE will select jobs to be reviewed. Supporting design folders, drawings and specifications for those jobs selected for review are to be submitted to the SCE. The material submitted will be checked for conformance to state standards and sound engineering practices. On-site reviews to evaluate construction quality and other features may be scheduled. The SCE will make a written report to the State Conservationist when the review is complete.

(2) Area staff will conduct a post review of the first plan submitted by each engineering Technical Service Provider (TSP) and a minimum of 5 percent of all plans submitted thereafter.

Subpart A - Review and Approval

MN501.09 Exhibit - Engineering Technical Approval Authority

See Form MN-ENG-013 - Ethics Statement and Engineering Technical Approval Authority.

**MN501.31 National Handbook of Conservation Practices (NHCP).**

In some cases, compensating conditions may justify a variance from a conservation practice standard. Variances from the requirements of the NHCP cannot be approved at the state level, but are handled according to GM Part 450-401.16. Variances from the requirements of Minnesota Practice Standards as contained in the Technical Guide, Minnesota Supplements to the NEM, Minnesota Engineering Field Handbook Supplement, and other Minnesota technical references may be granted by the State Conservation Engineer.

(a) The request for a variance shall be made by the responsible Area Engineer or Project Engineer on a case-by-case basis. The decision to grant a variance must be based upon complete documentation showing that the variance is justified and will result in an effective and acceptable practice. The Area Engineer or Project Engineer is responsible for providing the documentation. The level of documentation depends upon the complexity of the request. The following may be required:

1. Project name, location, and sponsor/owner name and address.
2. Description of the project, including purpose, protected features, existing problems, and physical features, etc.
3. Reason for the requested variance.
4. Hydrology and hydraulic analysis for the design required by the standard and for the proposed design if different from the standard.
5. Geology and/or soil descriptions for the site.
6. Photographs of the site.
7. Proposed design, including design documentation, drawings and specifications.
8. Cost and benefit economic analysis for both proposed design and standard design.
9. Description of the operation and maintenance requirements for the proposed design.
10. Supporting evidence that shows the proposed design will work, especially existing successful installations.

The detail and extent of the documentation should be commensurate with the size and estimated cost of the proposed project.

(b) A variance may result in increased levels of operation and maintenance and/or a decreased level of protection. The owner/sponsor must understand the level of protection being provided and their responsibility for maintenance and repair. The owner/sponsor may be required to provide a written acknowledgement of their willingness to assume all risk and operation and maintenance involved with the design.

(c) Variances will not be granted where:

1. Failure of a structural measure due to a high-intensity storm would create an immediate hazard to life or result in serious damage to buildings, residence, roads or other high-value property.
2. Installation of the proposed measure would have significant adverse effects on the environment or other natural or cultural resources.
3. The proposed design is not in accordance with the laws and regulations of Federal, State, and local governments (e.g., dam safety rules, ordinances).

## Subpart A – Engineering Activities Affecting Utilities

### **MN503.02 General considerations.**

(e) A list of all utility companies including addresses, telephone numbers and names of contact persons should be maintained in the field office. This list can be used to contact utility companies concerning information about specific installations during design.

(1) A warning statement as follows shall be placed on all engineering plans:

**“State law and NRCS policy require that the excavator contact Gopher State One-Call at (800) 252-1166 for utility locations 48 hours prior to the start of excavation work.”**

*Note: Previous warning statement wording is acceptable also.*

(2) If subsurface investigations or construction of any work will be carried out with NRCS assistance, or under a contribution agreement, form MN-ENG-098, “Utility Notice” (see exhibit MN503.07) shall be sent or delivered to all affected landowners/operators or sponsors. The landowners/operators or sponsors are to provide the requested information, sign the form, and return Part 1 to the field office. Part 2 shall be forwarded to the excavator for timely completion and submission to the field office. The completed form must be returned before subsurface investigations or construction can begin. A copy of the signed form shall be retained in the case file.

(3) When a project has technical assistance provided by a private sector Technical Service Provider, the use of form MN-ENG-098 is not required. In that case, the statement in MN503.02 (e)(1) on the drawings is the minimum requirement beyond what is required by state law.

### **MN503.04 Buried utilities.**

(a) Form MN-ENG-098 shall be used in Minnesota on projects with NRCS technical assistance, or under contribution agreements. The landowner/operator or sponsor is to provide the information and take the actions as listed on Part 1 of the form. The excavator shall provide the information and take the actions as listed on Part 2 of the form.

*Note: Form MN-ENG-098 is not required for projects utilizing Technical Service Providers, although the warning statement in MN503.02(e)(1) is required.*

### **MN503.05 Checklist.**

Form MN-ENG-098 shall be used as the checklist. The checklist on the reverse side of Part 1 shall be completed for any work involving a buried utility performed with NRCS technical assistance or under a contribution agreement.

### **MN503.06 State laws.**

(a) Notification

(1) Notification of utilities shall be made through the Gopher State One-Call system as mandated by Minnesota Statute, Chapter 216D. The Gopher State One Call Excavators Handbook is available online at <http://www.gopherstateonecall.com>.

(2) The excavator is required to notify GSOC at least 48 hours prior to any excavation and will be held responsible for any damages to utilities if such notice is not given. The excavator is the person who actually performs the construction, soil boring, or other excavation activity and can be the contractor, the landowner, or an NRCS or state employee.

(b) Color Codes

Minnesota State Statutes, Chapter 216D, specifies color codes for use in marking utilities, proposed excavations and for surveying purposes. Fluorescent pink and white are the colors designated for surveying purposes and proposed excavations. These are the colors that must be used in Minnesota for marking work in areas where excavation activities will be performed.

Subpart A – Engineering Activities Affecting Utilities

MN503.07 Exhibits - Utility Notice and Checklist Form

See Form MN-ENG-098, Utility Notice, Part 1 and 2.

§MN503.10 General.

(a) Confined Spaces. Certain structures that the Natural Resources Conservation Service (NRCS) provides technical assistance on are classified as "Confined Spaces" by Department of Labor and Industry Rules. These rules contain specific requirements that must be met before a person enters a confined space. Generally all catch basins, sumps, reception pits, covered tanks, etc, that the NRCS designs are considered confined spaces. It is generally known that manure in these structures can produce dangerous gases; however, even dry structures or those with only clean water can also develop dangerous air conditions. These conditions can develop quickly and may even occur during construction.

(1) During the design of structures that may be considered confined spaces, fencing, suitable covers or other means shall be specified in the plans to protect those areas from unauthorized entry. The planned measures shall be in place prior to certification by the NRCS.

(2) Where a structure is included in a plan that meets the criteria for a confined space, an appropriate warning statement shall be included in the operation and maintenance plan.

(3) Where a sump is included in a design, flexible discharge hoses, guide rails with flange connections, or other mechanical methods shall be considered to eliminate the need for sump entry during pump maintenance.

(4) NRCS employees shall not enter a confined space for construction inspection or any other purpose without proper authorization. All requests for authorization to enter confined spaces shall be submitted to the state conservation engineer.

Subpart A - INTRODUCTION

MN505.03(b)(5)

§MN505.03 Review of work performed by consultants and suppliers.

(b) Site specific plans and specifications. Designs, drawings, and specifications completed for NRCS, sponsors, or landowners by consultants and others can expedite implementation of NRCS administered programs. For site specific plans prepared by consultants, who must be approved by NRCS, the following conditions must be met:

(1) All plans prepared by a Professional Engineer (PE), which are submitted to the NRCS for approval, should be reviewed by an engineer licensed in Minnesota.

(2) An itemized estimate and inspection plan prepared by the engineer must be submitted with the plan.

(3) As a minimum, inspection plans must include a description of critical inspection items, the frequency and timing of inspections, frequency and types of tests required, and qualifications of the inspectors. Inspections specified must be adequate to ensure that critical construction specifications are met and materials utilized are adequate.

(4) Review of work performed by Technical Service Providers for individual landowners will be limited to post reviews described in NEM MN 501.05(2).

(5) The following checklist may be used as a guide for review of pollution abatement engineering plans prepared in accordance with NEM 505.03(b):

**NRCS POLLUTION ABATEMENT SYSTEM REVIEW CHECKLIST**

1. Has a manure management plan been prepared either by NRCS or Consultant? (NEM 537)
2. Is the manure storage volume adequate to meet manure management plan requirements? (NRCS Standard 313)
3. Is all contaminated runoff and silage leachate stored or adequately treated? (NRCS Standard 784)
4. Is a plan view included, which shows all drainage directions near the feedlot? (NRCS Standard. 784)
5. Are all roofs and drainage areas to open lots diverted away or included in storage volume computations? (NRCS Standard 313, 784)
6. For dairy operations, is the milk parlor wash water stored or properly treated? (NRCS Standard 784)
7. Are all wells shown? Do they meet MN Department of Health setback requirements? (Standard 313, MN Rules Chapter 4725.4450)
8. Are any lots to be abandoned clearly identified along with time frame and requirements? (NRCS Standard 312)
9. Were a minimum of 2 soil borings taken (of adequate depth) for storage facilities, and are any special geologic conditions accounted for in design? (NRCS Standard 784)
10. Are storage pond liners adequate? (NRCS Standard 313)
11. Is water table control adequate (type, depth, filter, outlet, etc) if needed? (NRCS Standard 313)
12. For concrete tanks, is the floor slab reinforced? (NRCS Standard 313)
13. For concrete structures near feedlots, are requirements for equipotential plane met? (National Electrical Code, NEM 537)
14. Are safety signs, fences, grates, etc., specified where needed? (NRCS Standard 313)
15. Is access adequate for agitation and or emptying of storage facilities? (Should be pointed out as a consideration) (NRCS Standard 313)
16. Is vegetation specified for disturbed areas? (NRCS Standard 313)
17. Does the inspection plan specify the timing of inspections, qualifications of the inspector, surveys required, testing required, and documentation needed? (NRCS NEM 505)
18. Does the O&M plan address operational and safety aspects (including confined spaces warning if appropriate) of the planned structures? (NRCS Standard 313, 784)

Subpart A - INTRODUCTION

MN505.03(b)(5)

**NRCS POLLUTION ABATEMENT SYSTEM REVIEW CHECKLIST (cont)**

19. Do any parts of the plan present a potential operation or maintenance problem? These should be pointed out to the cooperator, but a resolution is not required for NRCS acceptance of the plan. (NRCS NEM 505)
20. Is an itemized cost estimate prepared by the engineer included? (NRCS NEM 505)
21. Is the NRCS Standards certification statement on the plan and signed? (NRCS NEM 505)
22. Is the proper PE certification present? (MN statute 326.12)

## Subpart B - Use of Non-NRCS Engineering Services

### **MN505.10 Non-project activities.**

#### (c) Assistance to Individual Land Users.

(1) The NRCS will normally furnish engineering assistance to individual landowners or operators in the planning, design, and supervision of construction of those commonly used soil conservation and water management practices which are part of a resource management system, and soil and water conservation measures which are installed with cost share programs.

(2) Normally, NRCS will not provide services for design and supervision of construction of engineering measures in the following categories:

(i) All jobs where the total time required for planning, design and supervision of construction exceeds 60 staff days.

(ii) All ponds, lakes and drainage facilities for real estate development (includes mobile home developments).

(iii) Engineering practices in urban areas, except where practices are minor in scope. Refer to GM, Title 450, Part 408 for policy on providing technical assistance in urban areas.

(iv) Engineering practices or systems with job approval class greater than Class VI.

Exceptions to the above limitations in providing technical service must be justified in writing, recommended by the ASTC(FO), and approved by the State Conservationist.

(3) When private engineers or others perform engineering work involving soil conservation and water management practices, NRCS may provide technical services on inventories and evaluations, design criteria and procedures, specifications and construction techniques so that the work will carry out the intended conservation objectives.

(4) NRCS encourages conservation district cooperators and others whom it assists to follow applicable Technical Guide Standards when conservation work is done for them by private engineers. If NRCS has technical responsibility, the work must comply with standards acceptable to NRCS.

#### (d) Assistance to Groups of Land Users.

(1) The NRCS will normally furnish engineering assistance to groups in the planning, design, and supervision of construction of such measures as drainage facilities, ponds for agricultural water supply, small floodwater and erosion control structures and other group practices that are within the approval authority of the engineer(s) assigned to the area staff.

(2) Normally, group project sponsors will obtain the services of private engineers for investigations, design and supervision of construction of engineering measures in the categories outlined in MN505.10(c)(2).

## Part 505 - Non-NRCS Engineering Services

(3) NRCS will usually make the preliminary investigations and studies for large group projects, and will provide design criteria and maintain contact with the work, as needed to insure that it is fully integrated with the conservation objectives of the job and acceptable by NRCS standards. In addition, where Federal financial assistance is involved, the NRCS will check the finished work for conformance to NRCS standards before certification as acceptable for receipt of Federal funds.

### (e) Assistance to Units of Government

(1) The NRCS will normally provide technical services to units of government concerned with land use and treatment to encourage the application of soil and water conservation principles and techniques in land use planning and conservation treatment. These services generally consist of furnishing inventory and evaluation reports to states, counties, cities, planning commissions, and other public entities, to their engineering organizations and to private engineers working for them.

(2) NRCS provides information and general technical assistance to units of government concerned with soil and water conservation in urban areas but normally does not perform detailed surveys, planning, design or supervision of installation of work. Details of planning and implementation are carried out by private engineers or technical staffs employed by those receiving the assistance.

## Subpart A – Procedures

### **MN511.04 Design Analysis**

(c) Software for NRCS official use can be found at the USDA Service Center's Common Computing Environment at <http://www.sci.usda.gov/CCE/>. The ITS staff will only assist in installing engineering software that is approved for official use. Other programs may be used as documentation only if approved by the State Conservation Engineer on a case-by-case basis. Spreadsheets used for design of conservation practices may be approved by the Area Engineer

**MN511.10 Scope.**

Design folders that meet the requirements of section 511.11 of the NEM shall be prepared for all jobs submitted to the State Office for review and approval and all jobs that are subject to dam safety rules and regulations.

**MN511.11 Design folders.**

(c) Design reports that meet the requirements of section 511.11(b) of the NEM shall be prepared for:

1. All designs associated with a permanent Wetland Reserve Program easement.
2. All designs for pollution abatement systems.
3. All designs where the owner will be required to obtain a permit for construction.

## Subpart C - Evaluation of Construction Materials

### **MN512.21 Evaluation Procedures.**

#### (a) Material Quality Evaluation Procedures.

##### (7) Shop drawings.

(i) *Definition:* The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by a contractor to explain in detail specific portions of the work required by the plans. It is furnished to: (a) provide details of fabrication and/or installation; or (b) to indicate the specific commercially fabricated item to be furnished to meet the requirements of the plans. Shop drawings for some items are indicated as being required by the drawings or specifications. Work requiring shop drawings shall not be installed until the shop drawings have been properly approved.

(ii) When shop drawings are furnished, the contractor must coordinate all such drawings and review them for accuracy, completeness, and compliance with contract requirements and indicate his or her approval thereon as evidence of such coordination and review. If shop drawings show variations from the contract requirements, the contractor must indicate such variations at the time of submission. Approval of the shop drawings does not relieve the contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of the plans.

(iii) Shop drawings should be reviewed by the designer (i.e., the person who designed the item for which the shop drawings are being submitted).

(iv) Shop drawings shall be approved by the incumbent in the same position as that which approved the plans.

(v) When construction is performed under a federal or federally-assisted contract:

(A) The State Conservation Engineer (SCE), will approve shop drawings for plans approved by him or her, except that a Project Engineer (PE)/Government Representative (GR)/Contracting Officer's Representative (COR) may approve shop drawings for any item that meets all of the following requirements: (a) is not buried; (b) is not permanently below the water surface; (c) is not embedded in concrete; and (d) is not part of a facility designed by a consultant engineer. Representative items for which shop drawings may be reviewed and approved by a PE/GR/COR are fence gates, trash racks and guard rails, and forming plans. Representative items for which shop drawings must be reviewed by the designer and approved by the SCE include reinforced concrete pipe details, water control gate details, manhole and cover details, and details of items designed or specified by a consulting engineer.

(B) The PE/GR/COR shall review the shop drawings submitted by the contractor to see if they appear to meet the contract requirements. If they do not appear to meet the contract requirements, the shop drawings shall be returned to the contractor (through the contracting officer in federally-assisted contracts) with an explanation of why they will not be reviewed further.

(C) If the shop drawings appear to meet the contract requirements, and the PE/GR/COR has approval authority as indicated above, he/she shall: (a) review the shop drawings; (b) make appropriate comments or corrections, as necessary; (c) approve the drawings, if appropriate, subject to any necessary corrections; (d) return the marked shop drawings to the contractor (through the contracting officer in federally-assisted contracts); and (e) send a marked copy to the SCE.

(D) If the shop drawings appear to meet the contract requirements, and the PE/GR/COR does not have approval authority as indicated above, he/she shall send two (2) copies (three (3) copies if a consulting engineer is to review the shop drawings) with any comments to the SCE. The SCE will: (a) have the shop drawings reviewed and approved, if appropriate, with comments and corrections as necessary; (b) return one marked copy to the PE/GR/COR; and (c) retain one marked copy for reference. If a consultant is involved, the SCE will submit two (2) copies to the consultant for review and comment. The consultant shall return a marked copy with his or her recommendations to the SCE.

(E) The marked copy returned to the PE/GR/COR becomes the official NRCS copy, and shall be filed in the GR/COR contract file.

(F) The PE/GR/COR shall indicate NRCS approval on a copy, along with corrections and comments as necessary, and return it to the contractor (through the contracting officer in federally-assisted contracts). Additional marked copies shall be made and distributed as necessary.

(G) Materials must be examined on the jobsite, regardless of how they are evaluated initially. Materials may become defective as a result of improper storage, handling, or other causes.

(b) Generally, projects that incorporate material specifications require new material. In some cases "used material" not covered by material specifications can be used in CO-01 construction. For example, a "used" pipe may be acceptable for a farm crossing in a drainage ditch.

(1) Used material shall not be used for cost-shared components in cost-share programs unless approved by the SCE. The area engineer shall recommend to the SCE on a case-by-case basis whether used material should be used. The area engineer's recommendation and the SCE's approval shall be documented and placed in the design file. The documentation shall include an evaluation of material adequacy.

(2) Used material may be used during construction for temporary works of improvement, such as a stream crossing, if it is going to be removed after serving its purpose.

(3) The following used materials are approved for use:

- Heavy equipment rubber tires when used as a component of a livestock watering trough.
- Railroad ties when they are sound and free of rot and used as fence posts.
- Structural steel when approved by the designer for use in building frame construction.

### **MN512.23 Prequalification of Materials**

(c) (iii) The list of approved prequalified materials for Minnesota is filed in Chapter 17 of the Engineering Field Handbook. The list is updated periodically.

## Subpart D - Quality Assurance Activities

### MN512.30 General.

(c) Quality assurance plans (construction inspection) shall be prepared and implemented for the following waste storage facilities: (1) All Class IV or V structures, (2) All structures constructed in the Karst region, and (3) All others deemed appropriate by the Area Engineer.

### MN512.32 Quality assurance procedures.

(d) For each Class V job approved in the field, the responsible engineer or technician shall determine the degree of inspection required to insure acceptable results in each element of work, and shall consult with the responsible line officer to assure that appropriate personnel are assigned and scheduled accordingly. For each Class V job approved in the state office and all Class VI-VIII jobs, the state conservation engineer shall determine the degree of inspection required. The responsible line officer is to assign and schedule personnel accordingly.

(e) Natural Resources Conservation Service personnel shall not inspect or approve the installation of electrical pumps and other electrical machinery and wiring services to them. The electrical wiring shall be installed and inspected in accordance with the Minnesota Electric Act. The owner or electrical contractor shall properly request electrical inspection and furnish the serial number of the "Request of Electrical Inspection" as evidence he/she has complied with the Minnesota Electric Act.

Subpart E - Engineering Equipment, Records, and Coordination

§MN512.41 Records.

(a) Form SCS-ENG-310, Job Diary, shall be used for all works constructed under contract where federal financial assistance funds are paid. In addition, a job diary shall be kept for all structures that are subject to the Dam Safety Rules of Minnesota.

(1) Special effort should be taken to maintain high quality job diaries. The state and area engineering staffs will review diaries and offer comments during construction reviews.

(2) Instructions for completing the job diary shall be followed, as set forth in Part 517 of the National Contracts, Grants and Cooperative Agreements Manual.

(d) For Class I-V and low hazard Class VI projects, Conservation Assistance Notes or equivalent are an acceptable method of documenting construction

## Subpart C - Dams

### **MN520.21 Definition and Classes.**

(f) NRCS policy in Minnesota for maintaining an inventory of dams is those which meet any of the following criteria:

(1) All class (b) and (c) dams.

(2) All class (a) dams having more than six feet of overall height between the top of the settled dam and the lowest elevation at the downstream toe and a storage capacity of 50 acre/feet or more. Storage capacity is the capacity at the crest of the emergency spillway or the elevation of the top of dam if there is no emergency spillway.

(3) All class (a) dams with an overall height of 25 feet or more and a storage capacity of more than 15 acre/feet (height and storage capacity definitions are in (2) above).

(4) All dams with an overall height of 35 feet or more (height as in (2) above).

(g) Inventory size dams will be included in the NRCS inventory if they meet all of the following:

(1) Dam was built with NRCS technical and/or financial assistance.

(2) The dam was built according to NRCS standards and specifications in effect at the time of construction.

(3) Alterations to the dam since the time of construction have been made in accordance with NRCS standards and specifications.

(h) All information requested on Form MN-ENG-129 is to be included in the NRCS inventory. A copy of the form and instructions for completing the form are shown in Section MN520-43 Subpart E, Exhibits.

(i) Inventory of new dams. As new dams are constructed, the required data is to be added to the NRCS inventory on the basis of design and construction records. The individual approving the design shall, to the extent possible, complete form MN-ENG-129. The individual making the final construction check will check form MN-ENG-129, make any needed as-built corrections, and verify that all items are complete. One copy of MN-ENG-129 is to be forwarded through the Area Office to the State Conservation Engineer (SCE) and one copy retained in the case file.

(j) MN Department of Natural Resources (MN-DNR) dam inventory. State inventory information will be sent to the MN-DNR at least annually, by the state office. All needed information will be available from form MN-ENG-129. The MN-DNR will assign national dam inventory ID numbers.

(k) Entry, storage, and retrieval of data.

(1) Automatic data processing procedures will be used to maintain the inventory. Data will be entered at the state office.

(2) Inventory data will be retrieved as needed by the state office and copies of the inventory furnished to respective area and field offices.

## Part 520 - Soil and Water Resources Development

(l) Keeping the inventory current. Data on new dams, updated or corrected data on previously submitted dams can be submitted at any time. Data on all dams completed during a calendar year must be forwarded through the Area Office to the SCE by January 15 of the following year. This data will then be entered into the dam inventory database.

(m) Responsibility.

(1) The SCE provides overall coordination for the inventory of dams.

(2) Each ASTC(FO) insures the inventory policy is carried out by the field offices.

(3) Each area office will review the MN-ENG-129 forms received from the field, for completeness and accuracy, before transmitting them to the state office.

### **MN520.23 Classification.**

(b) Hazard classification of a dam shall be done early in the planning stage so that unnecessary delays and duplication of work can be avoided. The following procedure shall be followed when determining hazard class:

(1) Visually inspect the site and upstream and downstream conditions. If the hazard class is obvious, this will be documented and no further analysis is required.

(2) If the hazard class is not obvious from the visual inspection, a breach analysis may be required.

(i) A breach analysis, when warranted, shall be evaluated with nonstorm conditions downstream of the dam and the reservoir water surface at the emergency spillway elevation, the principal spillway hydrograph peak elevation, or the emergency spillway hydrograph peak elevation, whichever is highest.

(ii) SCS Simplified Dam Breach Routing Procedure, TR-66, may be used for classification. This assumes an instantaneous breach and will give a conservative hazard classification. For more detailed breach analysis, the National Weather Service Dam Break or Simplified Dam Break Flood Forecasting Models will normally be used.

(iii) When the National Weather Service breach analysis procedures are used, an embankment decay time during breaching is deemed appropriate and should be based upon the actual embankment and foundation materials placed. The decay time will normally vary from an instantaneous breach up to about 3 hours, depending on the ability of the embankment and abutment materials to resist erosion.

(3) Hazard classification shall be documented on form MN-ENG-027. See Exhibit MN520.40.

(4) Guidelines used by NRCS in Minnesota to evaluate the hazard classification of a dam are based upon the potential losses that could result if a dam failure should occur. These guidelines are given in Exhibit MN520.41.

Subpart C - Dams

**MN520.28 Potential impact area—class (a) dams of inventory size and all class (b) dams.**

(b) Requirements.

(1) Use breach routing procedures for all class (b) dams.

(i) For class (a) dams, the individual exercising design approval authority will determine the need for a breach routing. A conservative estimate may be made in place of breach routing. A conservative estimate of the potential impacted area could be as follows: The area flooded from the dam downstream to a major receiving stream. Depth of the flood wave is to be two-thirds of the dam height at the upper end and decreasing uniformly to a depth which covers the flood plain at the lower end.

(2) A map such as the USGS topographic map will be used to show the impact area determined by breach routing.

(i) When a conservative estimate is made to determine the impact area, a written narrative (see Exhibit MN520.42) and/or a map will be used to describe the impact area.

(ii) Documentation of the method or thought process used to develop the potential impact area shall be included in the design file.

(iii) The engineer with design approval will prepare a narrative and/or a map indicating precautions to further development.

(c) Distribution.

(1) For class (a) dams that are designed and approved by field engineers, the District Conservationist is responsible for transmitting information on potential impact areas (see Exhibit MN 520.42). For all other dams, the State Conservationist will transmit the information.

Subpart E - Exhibits

“Reserved”

Subpart E - Exhibits

MN520.40 Documentation for Hazard Classification

See Form MN-ENG-027, Documentation for Hazard Classification

Subpart E - Exhibits

MN520.41

MN520.41 Guidelines for evaluating potential hazards for dam classification.

HAZARD CLASSIFICATION			
DAMAGE TO:	(a)	(b)	(c)
<b>LOCATION</b> Area in which the dam will be installed	Rural or agricultural – Areas of mostly farming or ranching. Urban housing developments do not exist and none expected during structure design life. Agricultural land – used for agricultural production.	Predominantly rural or agricultural.	Developing or urban.
<b>ROADS</b> Township and county – All rural area rounds without concrete or bituminous surfacing	May damage – Damage may occur when road surface acts as weir and $d > 2$ ft.		
Main highways – U.S., interstate, and turnpike highways, and any concrete or bituminous surfaced township, county or state road that serves as the only access to a community	No significant damage. No overflow of the road or overflow at $d < 1$ ft. for only a short time (less than 1 hour).	May damage – damage may occur when road surface acts as weir and $d > 2$ ft.	Serious damage – Interruption of service for more than 1 day.
<b>RAILROADS</b> Minor – Interstate railroads used as frequently as one time per day. Materials carried are relatively nonperishable, agricultural products, or products if disrupted would not adversely affect local economy, safety, or general well-being of the area.	No significant damage. Overflow of the bed for short periods at depths of less than 1 ft.	May damage – Damage may occur when road surface acts as weir and $d > 2$ ft.	
Main – Intrastate or interstate railroads used more frequently than one time per day. Disruption would adversely affect economy, safety, and general well-being of the area.	No overflow of bed and no significant damage to embankment or culvert system.	May damage – No interruption of services. Minor damages may occur (overflow of less than 1 ft. for very short periods.).	Serious damage – Interruption of service for more than 1 day.
<b>BUILDINGS</b> Farm – Farm buildings – On farm buildings not occupied by people or having potential for occupy.	May damage Damage may occur when $D > 3'$ and depth x velocity is greater than 15.		
Homes – Single family residences, apartments, nursing homes, motels, hotels, and hospitals.	May damage – Damages limited to flooding basements used primarily for storage and heating units.	May damage – Any flooding above ground floor level.	Serious damage – damage may occur when $D > 3'$ and depth x velocity is greater than 15.
Isolated – Single family dwellings on farms and ranches. Does not include homes in developing areas.	Same as above.	Same as above.	Same as above.

Part 520 - Soil and Water Resource Development

MN520.41

BUILDINGS (con.)  
Industrial/Commercial --

No damages.  
Generally no significant loss of property or structural damage ( $d \leq 1$  ft. and velocity  $\leq 3$  fps.).

May damage –  
Kind, construction, and contents of building must be evaluated.

Serious damage --  
Kind, construction, and contents of building must be evaluated.  
General serious damage can occur at a depth of 3 ft or more and at a velocity of 5 ft/second or more.

Public –  
Schools, churches, libraries, etc.

No damages.  
Generally no significant loss of property or structural damage ( $d \leq 1$  ft. and velocity  $\leq 3$  fps.).  
Escape routes are out of direct flow and easily negotiated.

May damage –  
Kind, construction, and contents of building must be evaluated.  
Evaluate escape routes for handicap and children.

Serious damage –  
Kind, construction, and contents of building must be evaluated.  
General serious damage can occur at a depth of 3 ft or more and at a velocity of 5 ft/second or more.

UTILITIES  
Relatively important --

No damages to public utilities expected.

May damage –  
Damage may occur when buried lines can be exposed by erosion and when towers, poles, and above ground lines can be damaged by undermining or by debris produced from the flood plain.

Serious Damage –  
Damage can be expected and interruption of services for 3 to 4 days.

Important –  
Interstate and intrastate power and communication lines serving towns, communities, and significant military and commercial facilities in which disruption of power and communication would adversely affect the economy, safety, and general well-being of the area.

No damages.

No interruption of services and no damages would threaten interruption of services.

Serious damage –  
Interruption of service for more than 1 day.

LOSS OF LIFE  
Potential for loss of life –  
Flood depths greater than 1 ft. in living quarters; such as residences, apartments, nursing homes, motels, hotels, and hospitals, and on escape routes from such living quarters. Potential of loss of life should be considered for schools and recreational areas where adequate warning systems are not available.

No.

No.

Yes.

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Subpart E - Exhibits

United States Department of Agriculture



Natural Resources Conservation Service  
600 First St, NE  
Central, MN 55540

Phone: 651-202-7900 Fax: 651-202-7914

Date

Mr. O. J. Olson  
Rural Route 1  
Lake Wobegon, Minnesota

Dear Mr. Olson:

The USDA-Natural Resources Conservation Service (NRCS) is designing a livestock dam for you in the SE ¼ sec. 37, T115N, R39W on Lonely Creek, a tributary of the Minnesota River. Due to the dam's height (28 ft.) and storage capacity (51 ac/ft) it falls within the size category in which potential downstream damage should be considered in the event the dam should fail.

An evaluation was made of the area below your dam that could be flooded if a sudden failure should occur. The estimated flooded or impact area is 250 ft wide and 1 mile long. The evaluation indicated that the flooded area would affect only fences, trails, a county road and the valley crops. For this reason, the dam has been assigned a class (a) or low hazard rating. The design of the dam and emergency spillway will be based on this classification. If future development should occur downstream of the dam or should another dam be built upstream, hazard classification could change abruptly. You need to be aware of this so that you might alert future developers to the hazards that could occur. This is your responsibility.

This information is being provided to you so that you are aware of your responsibilities in connection with the proposed dam. You will need to provide this information to the Minnesota Department of Natural Resources and the county zoning officer when you apply for a permit for the dam.

Please let me know as soon as possible if you want NRCS to complete the final design of your dam. We will wait for your reply before we proceed. If you have any questions please do not hesitate to contact me.

Sincerely,

John J. Johnson  
District Conservationist

cc:  
Central County Soil and Water Conservation District, Central, MN

## SUBPART E – EXHIBITS

MN520.43 MN Dam Inventory Report, MN-ENG-129 Instructions

### INSTRUCTIONS FOR COMPLETING THE MINNESOTA DAM INVENTORY

The data base field information is given as follows:

( ) official field name (field name used in database) (units, where applicable) (field type, field size) -- field description and/or entry options.

The first series of fields (#1 - #52) comprise the National Inventory of Dams (NID) data fields that are standardized by the U. S. Army Corps of Engineers (USACE) and are reported by all National Inventory of Dams participating agencies.

(1) DAM NAME (DAM\_NAME) (alphanumeric, 65 var) -- Enter the official name of the dam. Do not abbreviate unless part of the official name. For dams that do not have an official name, use the popular name of dam. Do not insert meaningless information such as “Noname” or “Unknown” which only serve to increase the size of the file.

(2) OTHER DAM NAMES (OTHER\_NAMES) (alphanumeric, 65 var) -- If there are names other than the official name (i.e., reservoir name) of the dam in common use, enter the names in this space. Separate names using a semi-colon. Leave blank if none.

(3) DAM FORMER NAMES (FORMER\_NAMES) (alphanumeric, 65 var) -- Enter any previous reservoir or dam name(s), if changed. Separate the names using a semi-colon. Leave blank if none.

(4) STATE OR FEDERAL AGENCY ID (FED\_ID) (alphanumeric, 15 var) -- Enter the Official State or Agency identification number for the dam. The first 2 characters contain the State code. Characters 3 through 10 are assigned by the NRCS State office and must uniquely identify that dam within the State. This field was initially used in the 1983-1984 version of the SCS main frame inventory as the unique identifier. This need for a unique identifier has been replaced by the NID ID (Field #5) which has been assigned to every dam in the National Inventory of Dams (NID). This field may be the same as Field #5 or left blank.

(5) NID ID (NID\_ID) (alphanumeric, 7) -- Enter the official NID identification number for the dam. This is a required field and must have an entry to be included in the National Inventory of Dams. This field is used as the unique identifier for each dam in the Nation. This identifier is used to link the NID and NRCS databases with other databases for queries about NRCS dams. It is the same as the Corps of Engineers Identification Number assigned in the original 1981 USACE National Inventory of Dams. Once assigned, this NID ID will never be reused. If a dam is removed or decommissioned, the NID ID number for that dam is retired.

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The first two characters are the appropriate two letter State abbreviation, based on the location of the dam. The last five characters will be a unique number for that State. Ranges of numbers have been assigned to each Agency participating in the National Inventory of Dams effort so that assigning Agency can be determined.

For the NRCS compiled inventory, this number likely has already been assigned by the State Dam Safety Agency or another Federal Agency, and NRCS should obtain the NID ID from their State Dam Safety Agency. Only in very rare cases, such as non-participating States, will NRCS need to assign a NID ID. In this situation, please contact NRCS NHQ for the range of assigned numbers.

It is anticipated that different Agencies have assigned NID ID numbers to dams already added to the database by another Agency. Thus some existing dams may be counted twice in the National Inventory. As such cases are identified, NRCS will be notified and asked to correct the NID ID number in its database.

(6) LONGITUDE (LONG\_DEG) (number, 12 var) -- Longitude at the dam centerline as a single value in decimal degrees (Degrees + Minutes/60 + Seconds/3600). NOTE: Change in format from separate degrees, minutes and seconds used in previous NID. This is the X-coordinate for geocoding.

(7) LATITUDE (LAT\_DEG) (number, 12 var) -- Latitude at the dam centerline as a single value in decimal degrees (Degrees + Minutes/60 + Seconds/3600). NOTE: Change in format from separate degrees, minutes and seconds used in previous NID. This is the Y-coordinate for geocoding.

(8) SECTION, TOWNSHIP, RANGE LOCATION (GEODETIC\_LOC) (alphanumeric, 30 var) -- This is an optional field. States that track Section, Township and Range are requested to enter any information that is understandable and that clearly designates the individual values. For example, S.21, T.3N, R.69W. If the meridian location is needed to locate the dam, include it in the field. For example, S21 T3N R68W of 6PM (Sixth Principal Meridian).

(9) COUNTY (COUNTY) (alphanumeric, 30 var) -- Name of county (or parish) where dam is located.

(10) RIVER OR STREAM (STREAM) (alphanumeric, 30 var) -- Name of river or stream on which dam is built. If the stream is unnamed, identify it as a tributary to a named river, e.g., TR-Snake. If the dam is located offstream, enter the name of the river or stream and identify as offstream, e.g., Snake-OS.

SUBPART E – EXHIBITS

MN520.43 MN Dam Inventory Report, MN-ENG-129 Instructions

(11) NEAREST CITY/TOWN (NEAREST\_TOWN) (alphanumeric, 30 var) -- Name of nearest downstream city, town, or village that is most likely to be affected by floods resulting from failure of the dam.

(12) DISTANCE TO NEAREST CITY/TOWN (DIST\_TOWN) (miles) (number, 3 var) -- Distance to nearest downstream city, town, or village, to the nearest mile (and tenth if appropriate).

(13) OWNER NAME (OWNER\_NAME) (alphanumeric, 50 var) -- Name of owner of dam.

(14) OWNER TYPE (OWNER\_TYPE) (alphanumeric, 1) -- Use the following codes to indicate the type of owner:

F for Federal	U for Public Utility
P for Private owner	S for State
L for Local Government	

Typically for NRCS, this Field would be L if Field #53 = WS, PT, RC, or FP.

(15) DAM DESIGNER (DAM\_DSGNR) (alphanumeric, 65 var) -- Enter the name of the principal firm(s) or agency accomplishing design of the dam and major appurtenances operating features, and major modifications. List original designer, then modification designers (if applicable). Separate the names using a semi-colon. Typically for NRCS, if the design was prepared by an A&E and NRCS approved the plans, this Field would show the name of the A&E, and Field #46 would show NRCS involvement.

(16) NON\_FEDERAL DAM ON FEDERAL PROPERTY (NFDFP) (alphanumeric, 1) -- Indication whether the dam is a non-Federal dam on Federal property, such as in National Forests.

Y for Yes	N for No
-----------	----------

(17) DAM TYPE (DAM\_TYPE) (alphanumeric, 6 var) -- Codes to indicate the type of dam. List in order of importance. Codes are concatenated if the dam is a combination of several types. For example, an entry of CNCB would indicate a concrete buttress dam type.

RE for Earth	VA for Arch	ER for Rockfill
MV for Multi-Arch	ST for Stone	PG for Gravity
CN for Concrete	TC for Timber Crib	CB for Buttress
MS for Masonry	OT for Other	

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Part 520 – SOIL AND WATER RESOURCE DEVELOPMENT

MN520.43

(18) CORE (CORE) (alphanumeric, 3) -- Enter code to indicate position, type of watertight member, and certainty. Typically for NRCS, most dams would be HEK.

- Position: F for upstream facing;  
H for homogenous dam;  
I for core;  
X for unlisted/unknown.
- Type: A for bituminous concrete;  
C for concrete;  
E for earth;  
M for metal;  
P for plastic;  
X for unlisted/unknown.
- Certainty: K for known;  
Z for estimated.

(19) FOUNDATION (FNDN) (alphanumeric, 3) -- Code for the material upon which dam is founded followed by the certainty; do not separate with a comma.

- Material: R for rock;  
RS for rock and soil;  
S for soil;  
U for unlisted/unknown.
- Certainty: K for known;  
Z for estimated.

(20) PURPOSES (PURPOSES) (alphanumeric, 8 var) -- Codes to indicate the purposes for which the reservoir is used: Can use up to four purposes, list in order of importance. Codes are concatenated when multiple codes are used, e.g. ICF for irrigation, flood control, and fish and wildlife.

- |  |                      |                              |
|--|----------------------|------------------------------|
| I for Irrigation                                 | N for Navigation     | S for Water Supply           |
| R for Recreation                                 | H for Hydroelectric  | F for Fish and Wildlife Pond |
| T for Tailings                                   | D for Debris Control | O for Other                  |
| C for Flood Control and Storm Water Management   |                      |                              |
| P for Fire Protection, Stock, or Small Farm Pond |                      |                              |

(21) YEAR COMPLETED (YR\_COMP) (alphanumeric, 5 var) -- Year in which original main dam structure was completed. The NID allows addition of an "E" to indicate an estimated date. Use four digits to be Y2K compliant. Entry date is not to be changed when modifications or rehabilitations are done; use Field #22 below.

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(210-V-NEM, Amend. MN22, Oct. 1999)

SUBPART E – EXHIBITS

MN520.43 MN Dam Inventory Report, MN-ENG-129 Instructions

(22) YEAR MODIFIED (YR\_MOD) (alphanumeric, 60 var) -- Year of major modification or rehabilitation of dam or major control structure is completed. Use four digits to be Y2K compliant. Major changes are defined as structural, foundation, or mechanical construction activity which significantly restores the project to original condition; changes the project's operation, capacity or structural characteristics (e.g., spillway or seismic modification); or increases the longevity, stability, or safety of the dam. Use the codes to indicate the type of modification; up to ten may be entered, separated by semi-colons.

S for structural F for foundation M for mechanical  
E for seismic H for hydraulic O for other.

(23) DAM LENGTH (DAM\_LEN) (feet) (number, 7 var) -- Length of dam defined as length along top of dam. Also includes spillway, power plant, navigation lock, fish pass, etc., where these form part of the length of the dam. If detached from the dam, these structures should not be included.

(24) DAM HEIGHT (DAM\_HT) (feet) (number, 6 var) -- Height of the dam to nearest foot, defined as the vertical distance between the lowest point along the crest of the dam and the lowest point at the downstream toe which usually occurs in the natural bed of the stream or water course.

(25) STRUCTURAL HEIGHT (STR\_HT) (feet) (number, 6 var) -- Height of the dam to the nearest foot, defined as the vertical distance from the lowest point of the excavated foundation to the top of the dam

(26) HYDRAULIC HEIGHT (HYDR\_HT) (feet) (number, 6 var) -- Height of the dam to the nearest foot, defined as the vertical distance between the maximum design water level (freeboard design flood) and the lowest point at the downstream toe. Typically for NRCS, this is the same as Field #24.

(27) MAXIMUM DISCHARGE (MAX\_DISC) (cfs) (number, 7 var) -- The discharge in cubic feet per second (cfs) that the spillway will discharge when the pool is at the maximum designed water surface elevation.

(28) MAXIMUM STORAGE (MAX\_STOR) (acre-feet) (number, 10 var) – The total storage space in a reservoir below the maximum attainable water surface elevation. Typically for NRCS, this is the sum of #64, #65, #66, and #67.

(29) NORMAL STORAGE (NORM\_STOR) (acre-feet) (number, 10 var) – The total storage space in a reservoir below the normal retention level, excluding any flood or surcharge storage. Typically for NRCS, this is the sum of #64 and #67.

Part 520 – SOIL AND WATER RESOURCE DEVELOPMENT

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(30) SURFACE AREA (SURF\_A) (acres) (number, 8 var) -- Surface area of the impoundment at normal pool level.

(31) DRAINAGE AREA (DA) (square miles) (number, 10 var) -- Drainage area to the nearest hundredth, which is defined as the area that drains to the dam.

(32) DOWNSTREAM HAZARD POTENTIAL (CUR\_HAZ) (alphanumeric, 1) -- Code to indicate the most current potential hazard classification as defined in the NEM. Use L for NRCS Class a, S for NRCS Class b, and H for NRCS Class c. Use best and latest available information. Qualify currentness in Field #63. Do not use any other Codes since this Field is a critical filter for inclusion in the NID. Leave blank if unknown.

L for low      S for significant      H for high

(33) EMERGENCY ACTION PLAN (EAP) (alphanumeric, 2) -- Code indicating whether or not the dam has an Emergency Action Plan developed by the dam owner.

Y for Yes      N for No  
NR for Not Required by submitting agency

Typically for NRCS, if Field #32 is L or S, this Field is NR.

(34) INSPECTION DATE (LAST\_INSP\_D) (date, 10 var) -- Date of the most recent inspection of the dam prior to submission of data. Typically for NRCS, this means formal inspection led by a qualified engineer (can be NRCS or non-NRCS) as defined in NRCS National Operation & Maintenance Manual (NO&MM). To be Y2K compliant, the date should be entered as mm/dd/yyyy (06/30/1982).

(35) INSPECTION FREQUENCY (INSP\_FREQ) (number, 1) -- Scheduled frequency interval for periodic inspections, in years. Typically for NRCS, this is the frequency of formal inspections required by the State dam regulatory authority.

(36) STATE REGULATED DAM (STATE\_REG) (alphanumeric, 1) -- Code to indicate whether the dam is considered “State Regulated” by the National Dam Safety Program Act. A “State Regulated Dam” is defined in the Act as a dam for which the State executes one or more of the following general responsibilities: (a) Inspection; (b) Enforcement; (c) Permitting.

Y for Yes,      N for No

(37) STATE REGULATORY AGENCY (STATE\_REG\_AGENCY) (alphanumeric, 30 var) -- Name of the primary state agency with regulatory or approval authority over the dam.

(38) SPILLWAY TYPE (SPWY\_TYPE) (alphanumeric, 1) -- Letter code that describes the type of spillway:

MN520-14(14)

(210-V-NEM, Amend. MN22, Oct. 1999)

SUBPART E – EXHIBITS

MN520.43 MN Dam Inventory Report, MN-ENG-129 Instructions

C for Controlled U for Uncontrolled N for None

Typically for NRCS; if Field #20 includes I, leave this field blank; if Field #69 is NO, use N for this field; if Field #69 is not NO, use U for this field.

(39) SPILLWAY WIDTH (SPWY\_W) (feet) (number, 4) -- The width to the nearest foot, of the spillway that is available for discharge when the reservoir is at its maximum designed water surface elevation. Typically for NRCS, this is the bottom width on an open channel spillway.

(40) OUTLET GATES (OUT\_GATES) (alphanumeric, 15 var) -- Use one or more of the following codes to describe the type of spillway and controlled outlet gates, if any.

Use up to five types in decreasing size order, separated by semi-colons, followed by number of gates. Typically for NRCS, if Field #38 is U, this field is U; if Field #38 is N, this field is X.

X for none	U for uncontrolled	T for tainter (radial)
L for vertical lift	R for roller	B for bascule
D for drum	N for needle	F for flap
S for slide	V for valve	O for other controlled

(41) VOLUME OF DAM (VOL\_DAM) (cubic yards) (number, 10 var) Total number of cubic yards of materials used in the dam structure. Include portions of the powerhouse, locks, and spillways only if they are an integral part of the dam and are required for structural stability.

(42) NUMBER OF LOCKS (N\_LOCKS) (number, 1) -- Number of existing navigation locks for the project. Typically for NRCS, this is 0.

(43) LENGTH OF LOCKS (L\_LOCKS) (feet) (number, 4 var) Length of primary navigation lock to the nearest foot. Typically for NRCS, this field is blank.

(44) LOCK WIDTH (LOC\_W) (feet) (number, 3 var) -- Width of the primary navigation lock to the nearest foot. Typically for NRCS, this field is blank.

The following eight fields (#45 - #52) comprise additional data fields that are only provided by participating Federal Agencies submitting data to the NID. Typically NRCS should enter data for only other USDA Agencies involved with NRCS assisted dams. Use the following codes as applicable for each field:

Part 520 – SOIL AND WATER RESOURCE DEVELOPMENT

MN520.43

USDA NRCS (Natural Resources Conservation Service)  
USDA FS (Forest Service)  
USDA RHS (Rural Housing Service, formerly part of FmHA)  
USDA RUS (Rural Utilities Service, formerly part of FmHA)  
USDA FSA (Farm Services Agency, formerly ASCS)  
USDA ARS (Agricultural Research Service)

(45) FEDERAL AGENCY INVOLVEMENT IN FUNDING (FED\_FUND) (alphanumeric, 20 var) – Federal Agency involved in funding of the dam. Codes are concatenated if several agencies were involved. Typically for NRCS, this should be USDA NRCS if Field #53 = WS, PT, RC, FP.

(46) FEDERAL AGENCY INVOLVEMENT IN DESIGN (FED\_DESIGN) (alphanumeric, 20 var) -- Federal Agency involved in the design of the dam. Codes are concatenated if several agencies were involved.

(47) FEDERAL AGENCY INVOLVEMENT IN CONSTRUCTION (FED\_CONST) (alphanumeric, 20 var) -- Federal Agency involved in construction of the dam. Codes are concatenated if several agencies were involved.

(48) FEDERAL AGENCY INVOLVEMENT IN REGULATORY (FED\_REG) (Alphanumeric, 20 var) -- Federal Agency involved in regulating the dam. Codes are concatenated if several agencies are involved. Typically for NRCS, this field should be blank.

(49) FEDERAL AGENCY INVOLVEMENT IN INSPECTION (alphanumeric, 20 var) (FED\_INSP) -- Federal Agency involved in inspecting the dam. Codes are concatenated if several agencies are involved. Typically for NRCS, this field should be blank. USDA NRCS involvement means formal inspection by an NRCS engineer as defined in NRCS National Operation & Maintenance Manual (NO&MM).

(50) FEDERAL AGENCY INVOLVEMENT IN OPERATION (FED\_OP) (alphanumeric, 20 var) -- Federal Agency involved in operating the dam. Codes are concatenated if several agencies were involved. Typically for NRCS, this field should be blank.

(51) FEDERAL AGENCY OWNER (FED\_OWN) (alphanumeric, 20 var) -- Federal Agency which partly or wholly owns the dam. Codes are concatenated if several agencies were involved. Typically for NRCS, this field should be blank.

(52) FEDERAL AGENCY INVOLVEMENT - OTHER (FED\_OTHER) (alphanumeric, 20 var) -- Federal Agency involved in other aspects of the dam. Codes are concatenated if several agencies were involved. Typically for NRCS, this field should be blank.

MN520-14(16)

(210-V-NEM, Amend. MN22, Oct. 1999)

SUBPART E – EXHIBITS

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The following sixteen fields (#53 - #75) comprise additional data fields that should be provided for NRCS assisted dams.

(53) PROGRAM AUTHORIZATION (AUTH) (alphanumeric, var 2) -- Code for authorization.

CO for CO-01	GP for GPCP	OT for Other
WS for PL-566	RC for RC&D	PT for PILOT
FP for WF-03		

Dams authorized under WS, PT, RC, or FP are considered as “project” dams.

(54) WATERSHED NUMBER (WSHED\_NO) (number, 4) -- Contains the 4-digit watershed number for PL-566 dams. Typically the range is 2001 to 2800 for dams included in watershed plans developed within the state or 2801 to 2999 for dams included in plans developed by an adjoining state.

(55) WATERSHED NAME (WSHED\_NAME) (alphanumeric, var 40) -- Name of watershed project for PL-566 dams.

(56) PLANNED SERVICE LIFE (SERV\_LIFE) (alphanumeric, 3 var) – Number of years used to amortize the benefits of a project dam and/or determine the volume of sediment storage provided in the sediment pool.

(57) O&M INSPECTION RESPONSIBILITY (O&M\_INSP\_RES) (alphanumeric, 5 var) – Code to indicate the party assigned operation and maintenance inspection responsibility by an O&M Agreement or supplemental legal document for a project dam. Leave blank for non-project dams.

OWNER for owner in Field #13	NRCS for NRCS
JOINT for OWNER & NRCS	OTHER for other party
NONE for no existing or non-enforceable O&M Agreement	

(58) O&M INSPECTION CURRENT (O&M\_IN\_CURR) (alphanumeric, 1) – Code to indicate if an O&M Inspection and written report were completed on a project dam during the current or past calendar year. Leave blank for non-project dams.

Y for Yes      N for No

(59) O&M COMPLETED (O&M\_COMP) (alphanumeric, 1) – Code to indicate if O&M needs reported in prior O&M Inspection Report(s) for project dams have been completed. Leave blank for non-project dams.

Y for Yes      N for No

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(60) POPULATION AT RISK (POP\_RISK) (number, 5 var) -- All those persons that would be exposed to flood waters if they took no action to evacuate. It should be the maximum combination of people reasonably expected in the dam breach inundation zone simultaneously at any time of the day or night, including permanent residents, seasonal transients (campers, recreationists, etc), and daily transients (workers, students, shoppers, commuters, etc). Accuracy of the data should be qualified by Field #61.

(61) POPULATION AT RISK ACCURACY (POP\_ACC) (alphanumeric, 1) -- Code indicating if the Population at Risk number in Field #60 is based on a visual estimate or breach inundation map analysis.

E for Estimated visually

A for Analyzed with breach inundation map

(62) HAZARD CLASSIFICATION AS DESIGNED OR MODIFIED (DSGN\_HAZ) (alphanumeric, 1) -- Code to indicate the potential hazard to the downstream area at the time the dam was built or modified. Use L for NRCS Class a, S for NRCS Class b, and H for NRCS Class c. If an existing dam was modified to reflect a change in classification, enter the most recent classification for which the dam was designed and modified. Leave blank for unknown.

L for low      S for significant      H for high

(63) HAZARD POTENTIAL CLASSIFICATION YEAR (HAZ\_CLASS\_YEAR) (number, 4) -- Year of most recent verification of Hazard Potential Classification in Field #32 by qualified NRCS personnel. Use four digits for year to be Y2K compliant.

(64) SEDIMENT STORAGE (SED\_STOR) (acre-feet) (number, 10 var) -- The sediment storage capacity of the reservoir.

(65) FLOOD STORAGE (FLD\_STOR) (acre-feet) (number, 10 var) -- The flood storage capacity of the reservoir. Typically, this is the capacity of the reservoir between the elevation of the permanent pool and the crest of the auxiliary (emergency) spillway.

(66) SURCHARGE STORAGE (SUR\_STOR) (acre-feet) (number, 10 var) -- The surcharge capacity of the reservoir. Typically, this is the capacity of the reservoir between the elevations of the auxiliary (emergency) spillway crest and the top of dam.

(67) OTHER STORAGE (OTH\_STOR) (acre-feet) (number, 10 var) -- The other beneficial capacity of the reservoir.

SUBPART E – EXHIBITS

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(68) PRINCIPAL SPILLWAY TYPE (PS\_TYPE) (alphanumeric, 2) -- Code identifying the type of principal spillway as follows:

CP for Concrete Pipe	CM for Corrugated Metal
PL for Plastic	WS for Welded Steel
CB for Concrete Box	OT for Other
OC for Open Pipe	NO for None

(69) PRIMARY AUXILIARY SPILLWAY TYPE (AS1\_TYPE) (alphanumeric, 2) -- Code identifying the spillway type of the first auxiliary (emergency) spillway.

VE for Vegetated	RK for Rock
ST for Structural	EA for Earth
OT for Other	NO for None
HR for Hard Rock	SR for Soft Rock

(70) SECONDARY AUXILIARY SPILLWAY TYPE (AS2\_TYPE) (alphanumeric, 2) -- Code identifying the spillway type of the second auxiliary (emergency) spillway. Use the codes under Field #69 above.

(71) TERTIARY AUXILIARY SPILLWAY TYPE (AS3\_TYPE) (alphanumeric, 2) -- Code identifying the spillway type of the third auxiliary (emergency) spillway. Use the codes under Field #69 above.

(72) CONDUIT HEIGHT (COND\_HT) (feet) (number, 4 var) -- Height for rectangular or diameter for round conduit for the of the largest conduit through the dam to nearest tenth of a foot.

(73) CONDUIT WIDTH (COND\_W) (feet) (number, 4 var) -- Width (size) of the largest conduit through the dam to the nearest tenth of a foot. Leave blank if conduit is round.

(74) NUMBER OF CONDUITS (NO\_COND) (number, 2 var) -- Number of conduits through dam.

(75) COOL WATER RELEASE (COOL\_WATER) (alphanumeric, 1) -- Code indicating if a cold water release exists.

Y for Yes      N for No

Subpart E - Exhibits

MN520.43

See form MN-ENG-129, MN Dam Inventory Report

## Part 523 - Irrigation

### **MN523.01 Technical assistance.**

(a) NRCS will provide irrigation technical assistance to a district cooperator when irrigation is part of the resource management system.

(b) Technical assistance will consist primarily of determining soil type and suitability for irrigation, crop rotation and crop water requirements, and the quantity of water needed for the cropping system. Emphasis will be placed on controlling soil erosion and protecting water quality.

(c) NRCS will encourage the District Cooperator to secure engineering services for design of sprinkler systems and pumping plants from consultants, reliable irrigation equipment manufacturers, or irrigation equipment dealers.

## Subpart 531A – Geologic Investigations

### **MN531.00 General.**

On all jobs where NRCS provides geologic investigation and/or soil mechanics assistance, permission for geologic investigations and surveys shall be obtained. The permission shall be in writing, and a copy kept in the design folder. Responsibility for seeing that permission is provided for site investigations shall rest with the sponsoring organization on project-type jobs, special jobs, and group-type jobs, and with the landowner on all other projects. On land where landrights have been obtained, the landowner and/or occupant shall be notified several days prior to any field investigations. The District Conservationist is responsible for this notification.

### **MN531.04 Requirements for detailed geologic investigations.**

The NRCS will only provide detailed geologic investigations on jobs where NRCS staff is preparing the design.

NRCS may provide the equipment for geologic investigations as long as the work is within the capability of government owned equipment and the equipment can be scheduled.

When NRCS cannot meet the investigation requirements, the cooperator will be required to hire appropriate equipment to perform the investigation. The NRCS may provide staff to log soils, collect samples, and perform required tests.

Testing will be done through the National Design, Construction and Soil Mechanics Center (NDCSMC) whenever possible. All requests to the NDCSMC for testing will be made by the State Conservation Engineer.

### **MN531.08 Erosion, sediment, and pollution control during site investigations.**

All State laws affecting geologic investigations must be followed. Provisions shall be made to seal boreholes in accordance with Health Department Regulations when required.

In areas such as farmsteads or feedlots where there may be a high availability of pollutants, all NRCS borings shall be sealed in such a manner that the boring will not create a pathway for pollutant transport.

## Subpart D - Technology

### **MN537.01 NRCS technical assistance for environmental engineering.**

(c) MN NRCS Assistance on Agricultural Waste Management Systems.

(1) Assistance for MPCA Open Lot Agreements (OLA's). In accordance with the following stipulations, NRCS may provide technical assistance on OLA's for feedlot pollution abatement.

(i) NRCS must plan a full solution for pollution abatement. A detailed engineering plan is not required; however, enough investigation must be done to determine the feasibility of the pollution abatement plan. The plan for the full solution must be presented to the producer and documented in the file. The following items must be included in the plan:

1. Pollution problem evaluation.
2. Solutions or alternatives considered to solve problem.
3. A statement that the practices installed under the OLA's are not considered adequate to solve the pollution problem.

(ii) Technical assistance for OLA's is limited to clean water runoff management practices. Technical assistance for other practices such as vegetative filters, or waste storage facilities may only be provided as part of a complete pollution abatement system that meets the Wastewater and Feedlot Runoff Control (784) Interim Standard. Components installed for OLA's must meet the individual practice standards for those components.

(2) Stray Voltage Protection.

(i) The National Electric Code requires that concrete floors and structures in livestock confinement areas have wire mesh or other conductive elements installed in them that are bonded to the electrical grounding system. Confinement areas both inside buildings and outdoors such as open lots are included. Areas that do not contain electrically supplied equipment or systems are not required to comply; however, they may require a voltage gradient from an adjacent area.

(ii) Construction drawings that include concrete components that require an equipotential plane under the National Electrical Code must contain the following statement:

**"Wire mesh and reinforcing steel embedded in concrete placed as part of this construction drawing must be bonded and grounded in accordance with the National Electrical Code. All bonding and grounding must be approved by a State Electrical Inspector prior to concrete placement."**

The request for electrical inspection serial number shall be included as part of the construction documentation.

Part 537 – Environmental Engineering

(3) NRCS may provide technical assistance for non-permitted waste storage facilities under the following circumstances:

1. For facilities originally designed and construction certified by the NRCS but a permit was not obtained at the time of construction.
2. For preliminary investigations to determine if the storage facility is a pollution hazard that would qualify for financial or technical assistance from NRCS. Preliminary investigations do not provide borings of adequate depth or spacing to be used for final design purposes.
3. As part of a pollution abatement plan where work is needed to rehabilitate liners or abandon an existing storage facility to correct a pollution problem that currently exists.
4. Assistance for soil investigations should only be provided on sites where NRCS will be preparing a final design.

## Subpart A - Drawings

### **MN541.00 General**

(d) New Drawings. Whenever new drawings are developed a particular format must be used. This will ensure that everyone in the state can work on a drawing and they will know how it is set up. Minnesota NRCS CADD Standards give the criteria for setting up a drawing.

(1) When existing Minnesota standard drawings are converted to an electronic drawing they will be submitted to the state office for checking and distribution.

(2) If structural drawings are developed they shall have documentation to support the design. The design will be checked and approved by an engineer with appropriate approval authority.

(3) After a drawing has been developed and approved it will be considered an existing drawing and be subject to the policy for existing drawings as outlined below.

(e) Existing Electronic Drawings. If a Minnesota standard drawing is modified, a note needs to be added stating it was modified and the date. This note is not needed if the modifications were only to fill in the blanks. The electronic drawings will be classified as being structural or non-structural. The policy for the two classifications will be as follows:

(1) *Structural*. A structural electronic drawing is a drawing that has reinforced concrete, structural steel, etc. included. When these drawings are used none of the structural features can be modified without approval from the state office. The drawing can be tailored to the particular installation as long as the structural features are not modified. The person approving the plans is responsible for any changes made to the drawings.

(2) *Non-Structural*. The non-structural drawings can be modified to meet the needs of the particular application. The person approving the plans is responsible for any changes made to the drawings.

## Subpart A – Construction Specifications

### **MN542.03 Reference specifications.**

(c) In addition to the reference specifications designated in section 542.40, the following references shall be maintained in area and large-project offices. Hard copies of references that are available on-line are not required.

- Earth Manual, U.S. Dept. of Interior. <http://www.usbr.gov/pmts/writing/earth/>
- Concrete Manual, U.S. Dept. of Interior, Bureau of Reclamation.
- NEH Section 19, Construction Inspection. <http://www.info.usda.gov/CED/ftp/CED/neh19.pdf>
- NEH Part 642, Specifications for Construction Contracts.  
[http://www.nrcs.usda.gov/Technical/ENG/construction\\_specs\\_home.html](http://www.nrcs.usda.gov/Technical/ENG/construction_specs_home.html)
- Construction Industry, OSHA Safety and Health Standards (29 CFR 1926/1910), OSHA 2207, U.S. Dept. of Labor. <http://www.osha.gov>
- Standard Specifications for Construction, MN Dept. of Transportation.  
<http://www.dot.state.mn.us/tecsup/spec/index.html>
- Minnesota Construction and Materials Specifications for Conservation practices, NRCS.  
<http://www.mn.nrcs.usda.gov/technical/eng/MN-Construction-Specs.html>

(1) The references kept at project offices shall be kept intact and transferred to new construction locations as directed by the State Conservation Engineer.

(2) To prepare construction specifications for specific conservation operation jobs, the designer may use either the Minnesota NRCS specifications or the MNDOT specifications. The NRCS specifications can be used in their entirety with specific details or parts may be deleted as appropriate for the specific application. The cover sheet of the final edited specifications for each job should be signed by the same employee who approved the engineering drawings in accordance with NRCS policy.

(3) The "Instructions for Use" which accompany the NRCS Construction Specification should be used as a guide when developing site specific plans and specifications.

**MN542.40 List of References.**

Geotechnical fabric specifications are available in the Geotechnical Fabric Reports Specifier's Guide. This guide is maintained in the State Office and the Duluth Area Office.

ASTM reference specifications are available from the State Office. Other reference specifications may be obtained through the National Design, Construction and Soil Mechanics Center. Requests to the NDCSMC will be routed through the State Conservation Engineer.

§MN544.00 General.

All personnel are responsible for using equipment properly and for exercising due care while transporting the equipment. The Owner's Manual contains the manufacturer's recommendations for handling and storage of the equipment. The person to whom the equipment is assigned is responsible for maintaining it and for having the equipment checked, adjusted, and calibrated.

§MN544.01 Transporting equipment.

(a) Levels, transits, and other sensitive equipment shall always be transported in the case or box provided by the manufacturer.

(b) All equipment shall be transported in a manner that prevents falling or severe shocks if the vehicle should stop suddenly or cross rough terrain. All vehicles in which surveying equipment is commonly transported shall be provided with racks, boxes, tiedowns, etc. as needed to safely hold and protect the equipment. All equipment shall be protected against moisture, dust and dirt. Levels, transits, and similar equipment shall be further protected against vibration and shock by a layer of foam rubber, or other energy-absorbing material placed to cushion the bottom and sides of the instrument cases while in the vehicle.

(c) Care must be taken to prevent moisture damage to instruments. Instruments that get wet from rain must be toweled off and then allowed to air dry out of the case prior to extended storage.

§MN544.02 Adjustment and calibration.

(a) Survey instruments shall be checked at least once every year and adjusted, if necessary, according to the procedures outlined in Chapter 1 of the Engineering Field Manual. For instruments that receive little use, the Area Engineer may extend the interval between checks. Instrument checks and adjustments will be made only by qualified field office personnel, engineering technicians, or engineers. The area engineer shall determine who is qualified to check and adjust instruments in the area.

(b) When survey instruments or other equipment cannot be adjusted in the field, arrangements for repair or adjustment will be made through the procurement officer.

(c) For all instruments in an area, a record of checks, adjustment, and calibrations shall be maintained by the Area Engineer. As a minimum, the record will include the instrument description, location, serial number, the date of the check, the initials of the person who performed the check or adjustment, and a very brief statement describing what was done. If the instrument was sent in for repair and adjustment, the date and name of the company who did the work shall be noted in the record.