HE
196.5
.I8
1997

PROJECT DEVELOPMENT

INFORMATION PACKET

FOR

FEDERAL-AID CITY and COUNTY PROJECTS

NOVEMBER 1997

Prepared by:
Iowa Department of Transportation
Project Development Division
Office of Local Systems
Phone: 515-239-1528
Fax: 515-239-1966

.Form 000021-WP
2-75

HE
196.5
.I8
1997

IOWA DEPARTMENT OF TRANSPORTATION

To Office	Cities, Counties, Consultants, MPO's & RPA's	Date	November 1997
Attention		Ref. No.	800
From	"Make it Better" Team		
Office	Local Systems		
Subject	Project Development Packet		

DEPARTMENT OF TRANSPORTATION
JAN 13 1999
NASSIF BRANCH LIBRARY

In August, 1994, the Office of Local Systems established a Quality Improvement Team to review and improve upon the federal-aid project development process. The mission was to communicate federal-aid project development procedures to local agencies, beginning with the approval of the Statewide Transportation Improvement Program (STIP) and ending with obligation of federal funds by the Federal Highway Administration (FHWA). In January 1997, another Team (Make it Better) began meeting to clarify, update, and streamline the federal aid project process.

The attached packet is our compilation of efforts.

This update modified or eliminated some procedures while others were documented for the first time. The packet includes Project Development timelines, flow charts, guidelines, design criteria, Instructional Memorandums and forms to assist you through the federal-aid project development process. The main (fold out) flow chart will direct you to other sections of the packet when appropriate.

When you start developing a federal-aid project please review the packet with your Transportation Center Local Systems Engineer to insure that you have the latest information. If a project requires the use of Instructional Memorandums, contact your Transportation Center Local Systems Engineer to obtain the most recent version.

Also, be advised that any activity which you will request federal-aid reimbursement must have prior FHWA authorization before incurring any costs.

If you have any questions concerning the process please contact your Transportation Center Local Systems Engineer.

EJR:tlw
Attachment
cc: "Make it Better" Team -
LeRoy Bergmann-Local Systems
Roger Bierbaum-Local Systems
Dave Ellis-Southeast Iowa Transportation Center
Alan Estvold-Montgomery County
Mike Heitzman-FHWA
Gary Hood-Project Planning
Larry Jesse-Local Systems
Richard Storm-Woodbury County

TABLE OF CONTENTS

I TIMELINE/FLOWCHARTS

- PROJECT DEVELOPMENT TIME LINES
- LOCAL PUBLIC AGENCY (LPA)
  FEDERAL-AID (F.A.) PROJECT DEVELOPMENT
  PROCEDURES MAIN FLOW CHART
- SUPPLEMENTAL FLOW CHARTS (CHART 1P THRU 18P)

NOTE: DOES NOT APPLY TO PROJECTS ON THE NATIONAL HIGHWAY SYSTEM

PROJECT DEVELOPMENT TIMELINE

Time Line

Task Name	Years	2 Years												1 Year											
	Months	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Concept/Agreement (1P, Index #6)																									
Consultant/Agreement (Index #1)																									
Environmental Concurrence (4P)																									
Preliminary Engineering (2P, 5P, 6P, 7P, Index #5, #8)																									
Right of Way/Utilities (3P, 8P, 9P, 10P, 11P)																									
Final PS&E (12P, 13P, 14P, Index #9, #10)																									
Letting (15P, 16P)																									

( ) flow chart numbers or index numbers from "Project Development Information Packet For Federal Aid City And County Projects"

The red bars depict a complex project, the green a simple one.

A simple project is one that involves resurfacing an existing street, trail, or similar activities.

A complex project is one that involves using federal funds to pay a consultant's fees, buy land or buildings, or working on historic preservation. Land that has not been disturbed in any fashion can add complexities for archeological clearances, etc.

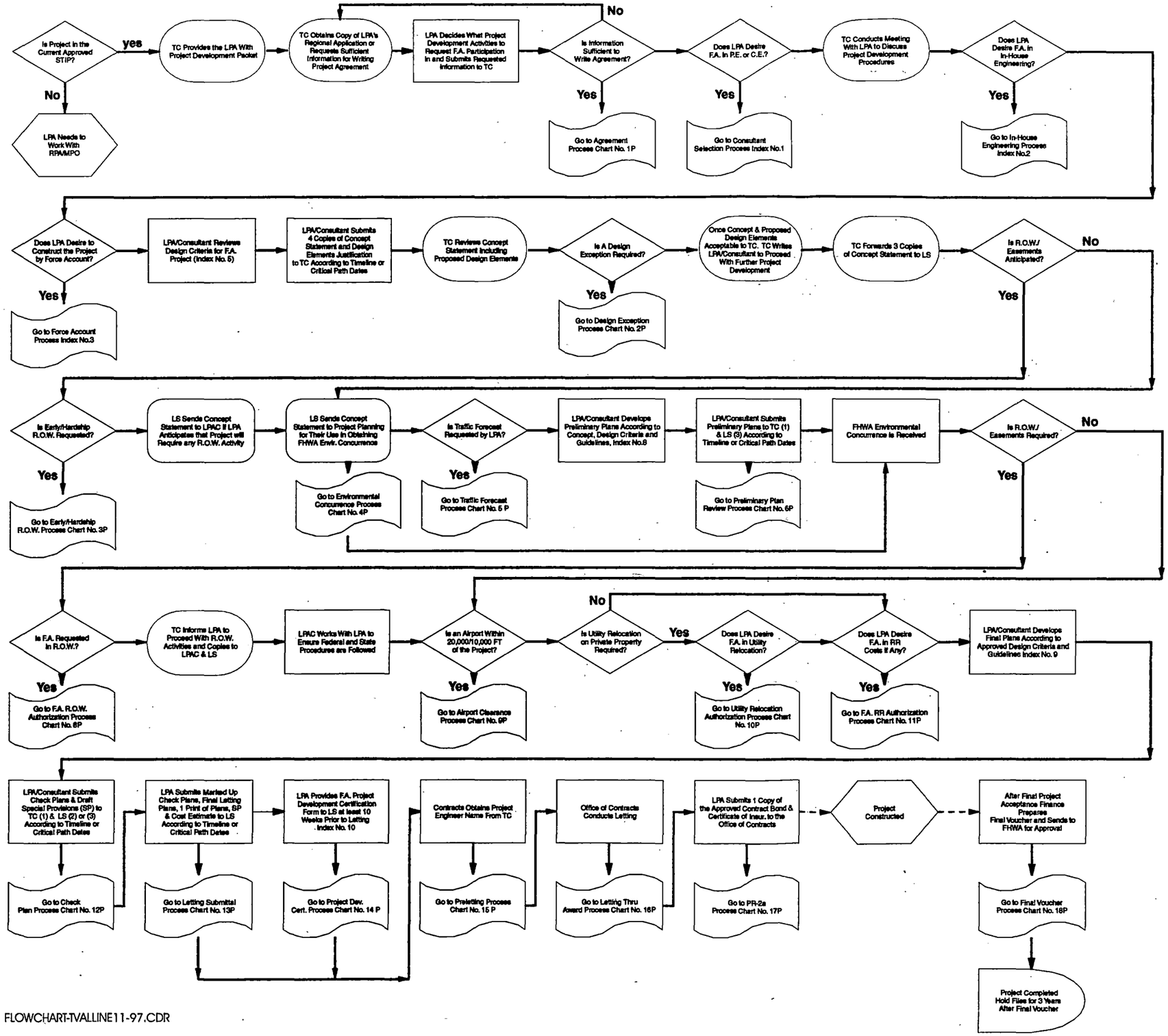
Target Letting Date

gpc30403

- MAIN FLOW CHART

November 1997

LPA F.A. PROJECT DEVELOPMENT PROCEDURES



MAIN FLOW CHART LEGEND

LPA	=	LOCAL PUBLIC AGENCY (CITY, COUNTY)
LS	=	LOCAL SYSTEMS OFFICE
TC	=	TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER
LPAC	=	LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY
F.A.	=	FEDERAL-AID
P.E.	=	PRELIMINARY ENGINEERING
C.E.	=	CONSTRUCTION ENGINEERING
STIP	=	IOWA STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM
FHWA	=	FEDERAL HIGHWAY ADMINISTRATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

= TC

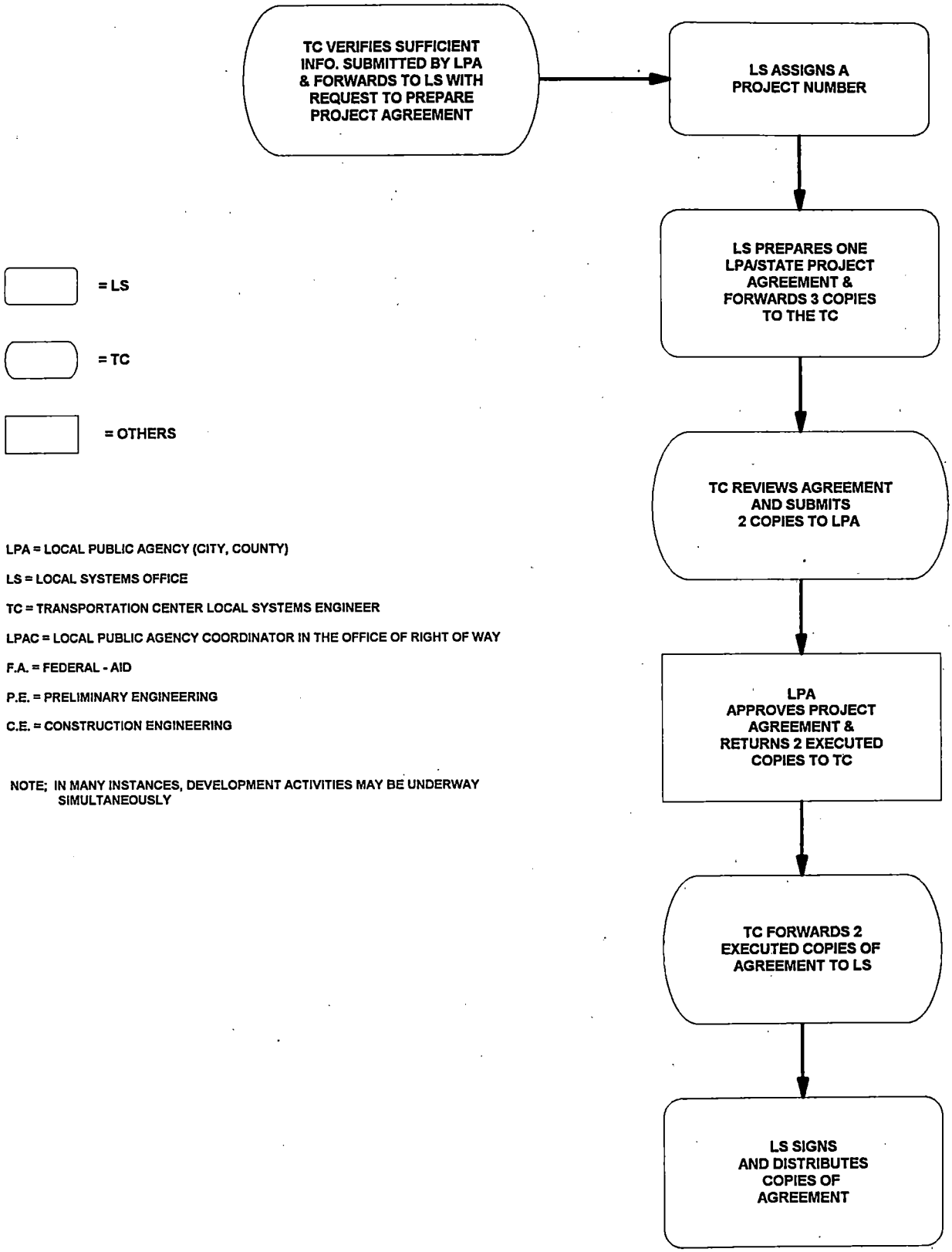
= LS

= OTHERS

FLOWCHART-TVALLINE11-97.CDR

SUPPLEMENTAL FLOW CHARTS (Chart 1P thru Chart 18P)

LPA / DEPARTMENT AGREEMENT PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

NOTE; IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

DESIGN EXCEPTION PROCESS

= LS

= TC

= OTHERS

LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

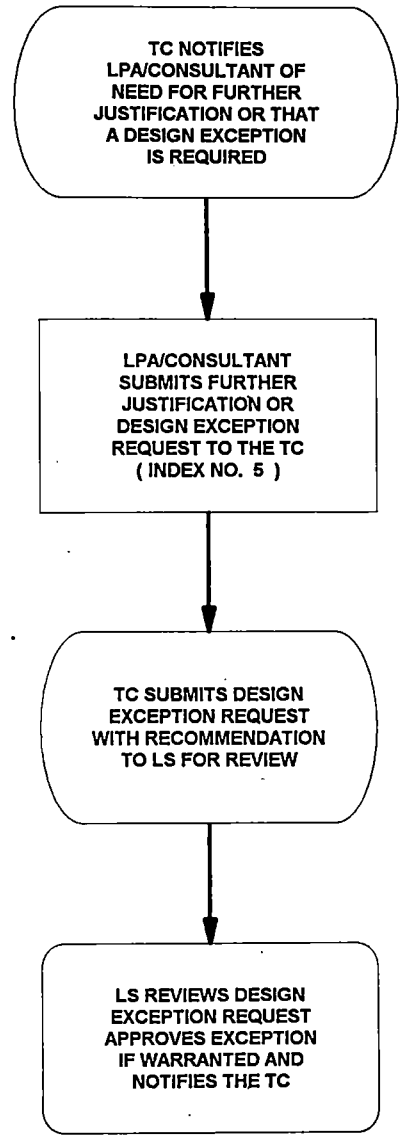
LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

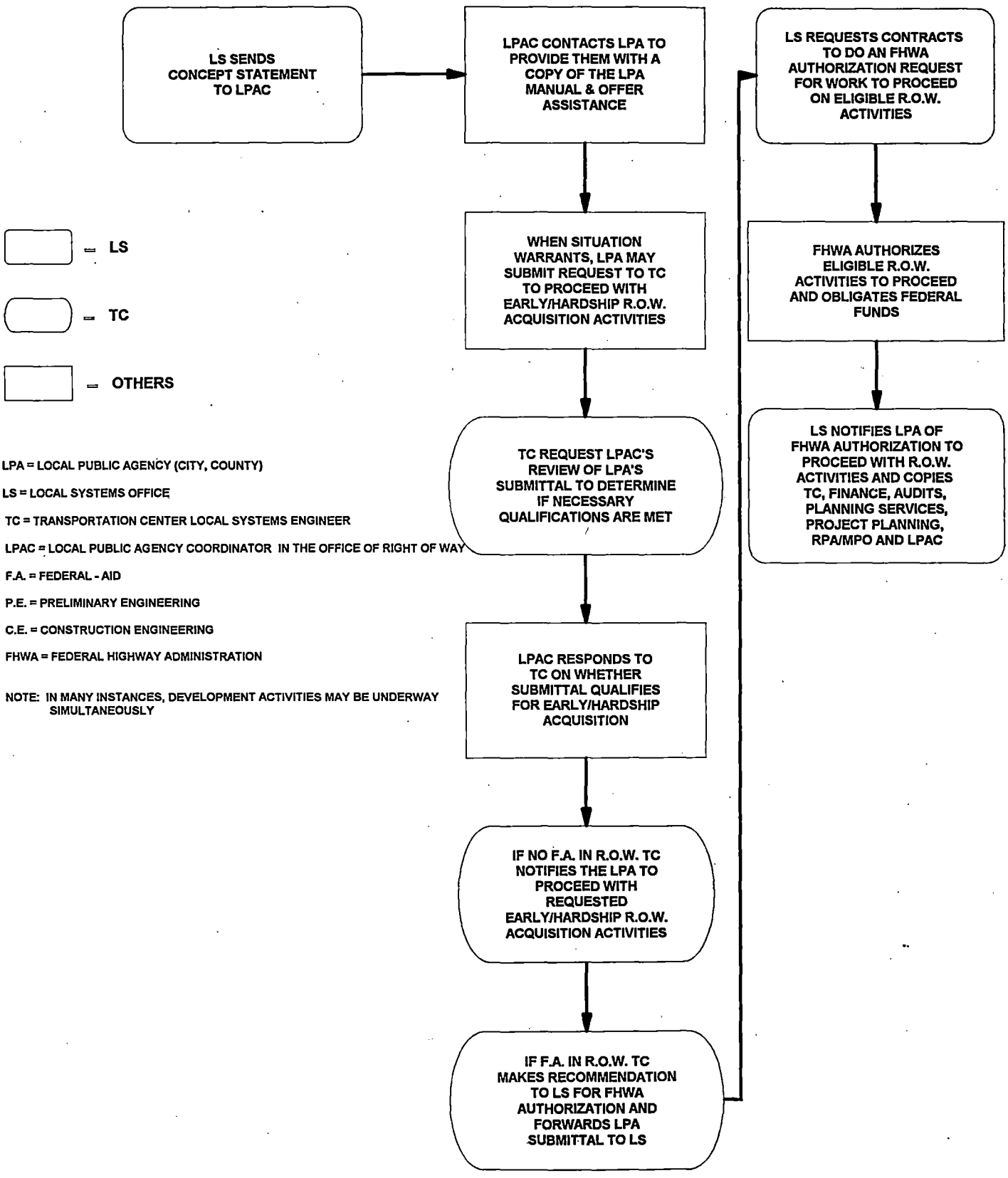
P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

NOTE; IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY



EARLY / HARDSHIP R.O.W. PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

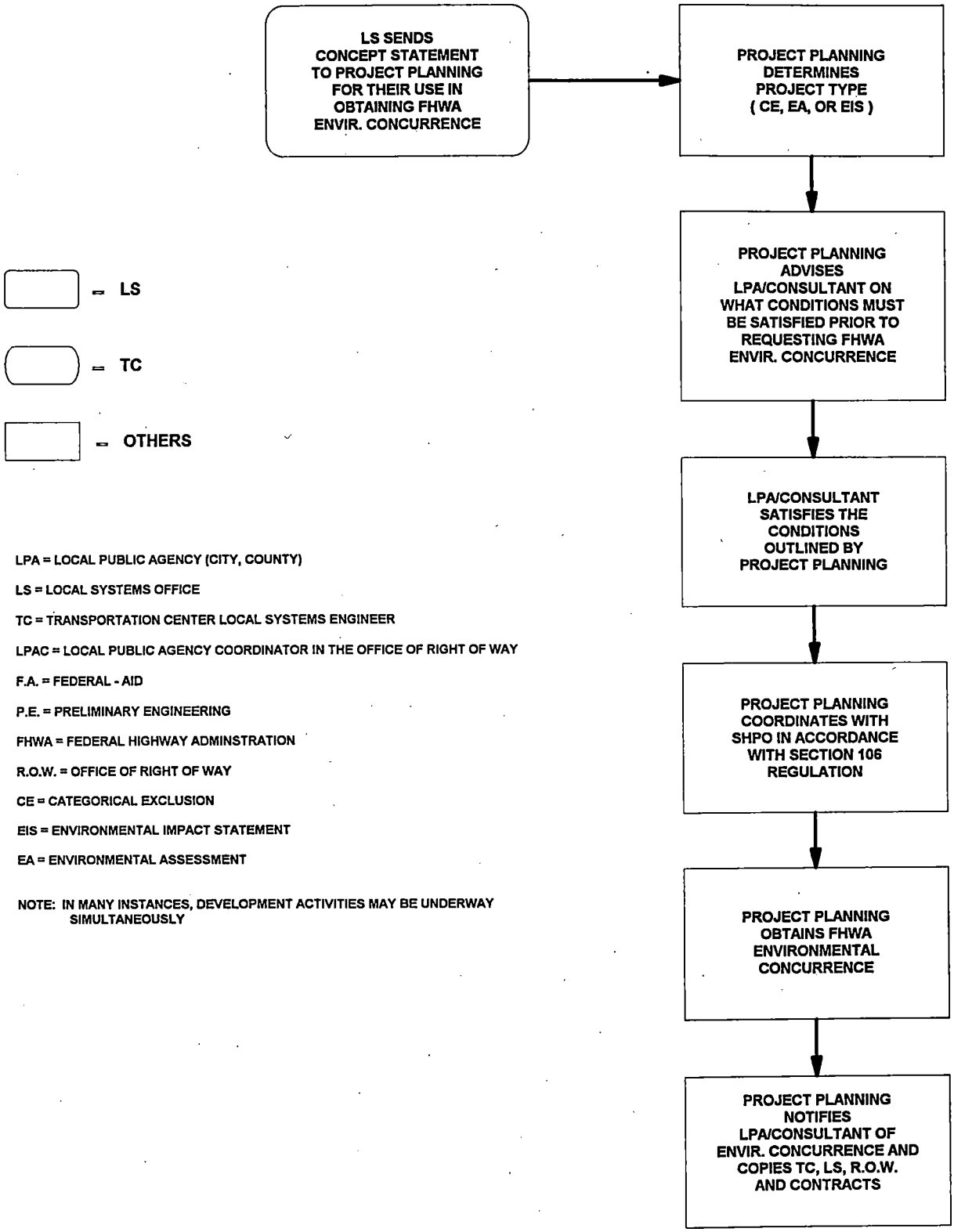
P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

FHWA = FEDERAL HIGHWAY ADMINISTRATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

ENVIRONMENTAL CONCURRENCE PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

FHWA = FEDERAL HIGHWAY ADMINSTRATION

R.O.W. = OFFICE OF RIGHT OF WAY

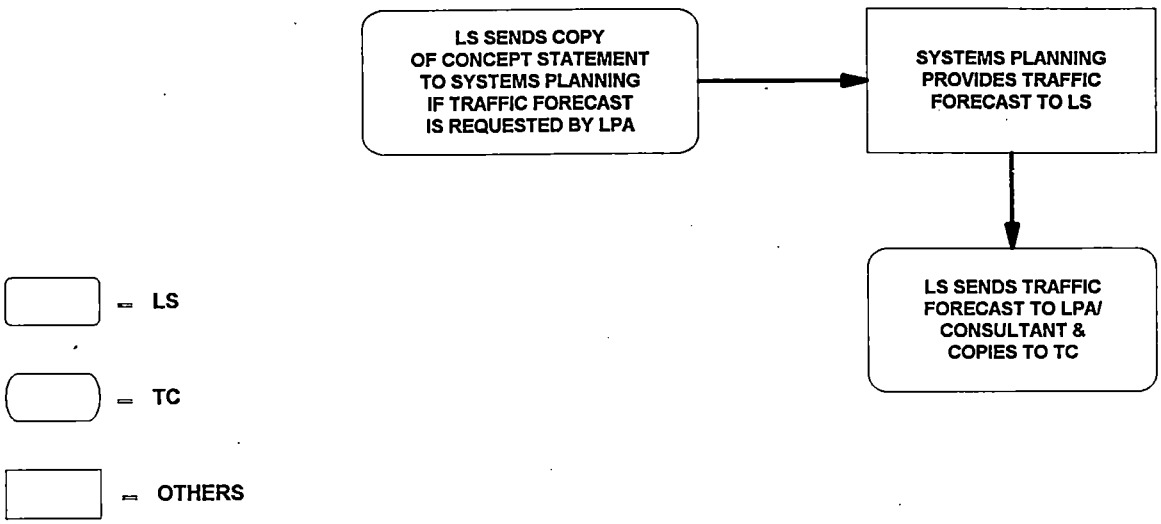
CE = CATEGORICAL EXCLUSION

EIS = ENVIRONMENTAL IMPACT STATEMENT

EA = ENVIRONMENTAL ASSESSMENT

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

TRAFFIC FORECAST PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

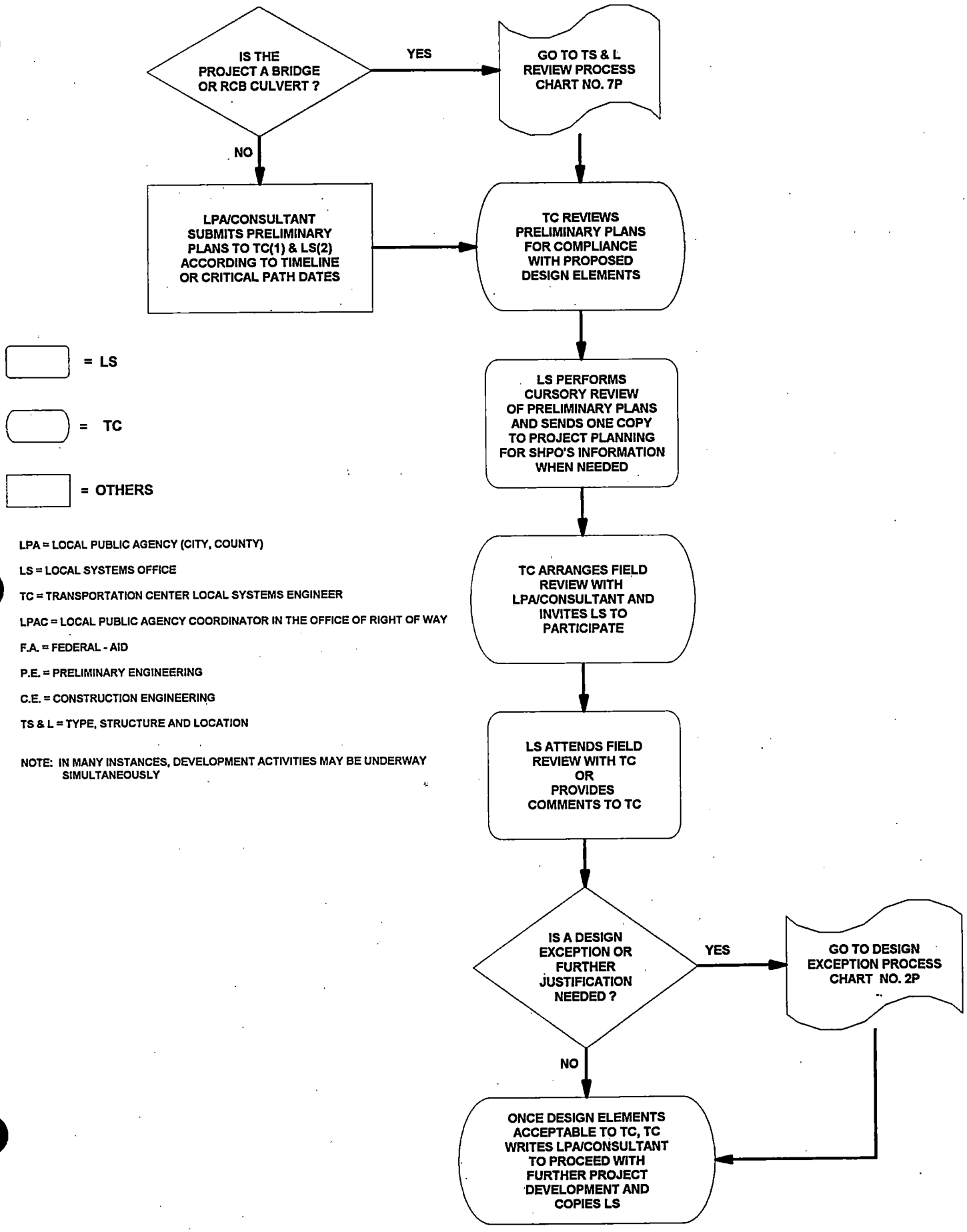
F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

PRELIMINARY PLAN REVIEW PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

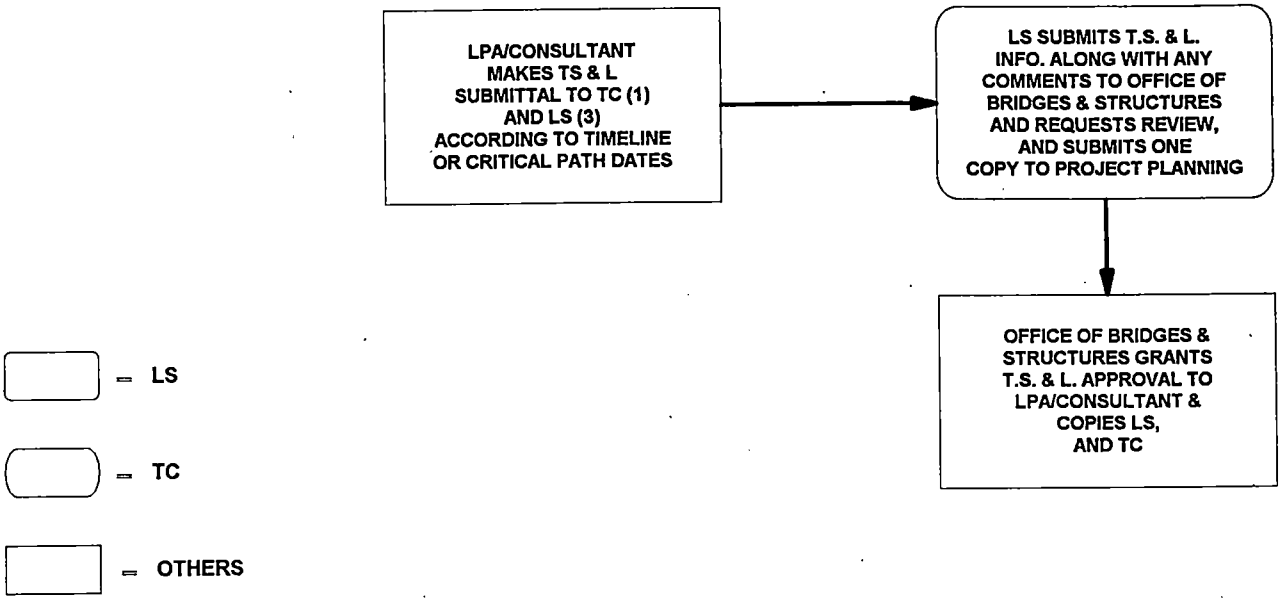
P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

TS & L = TYPE, STRUCTURE AND LOCATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

T.S. & L. REVIEW PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

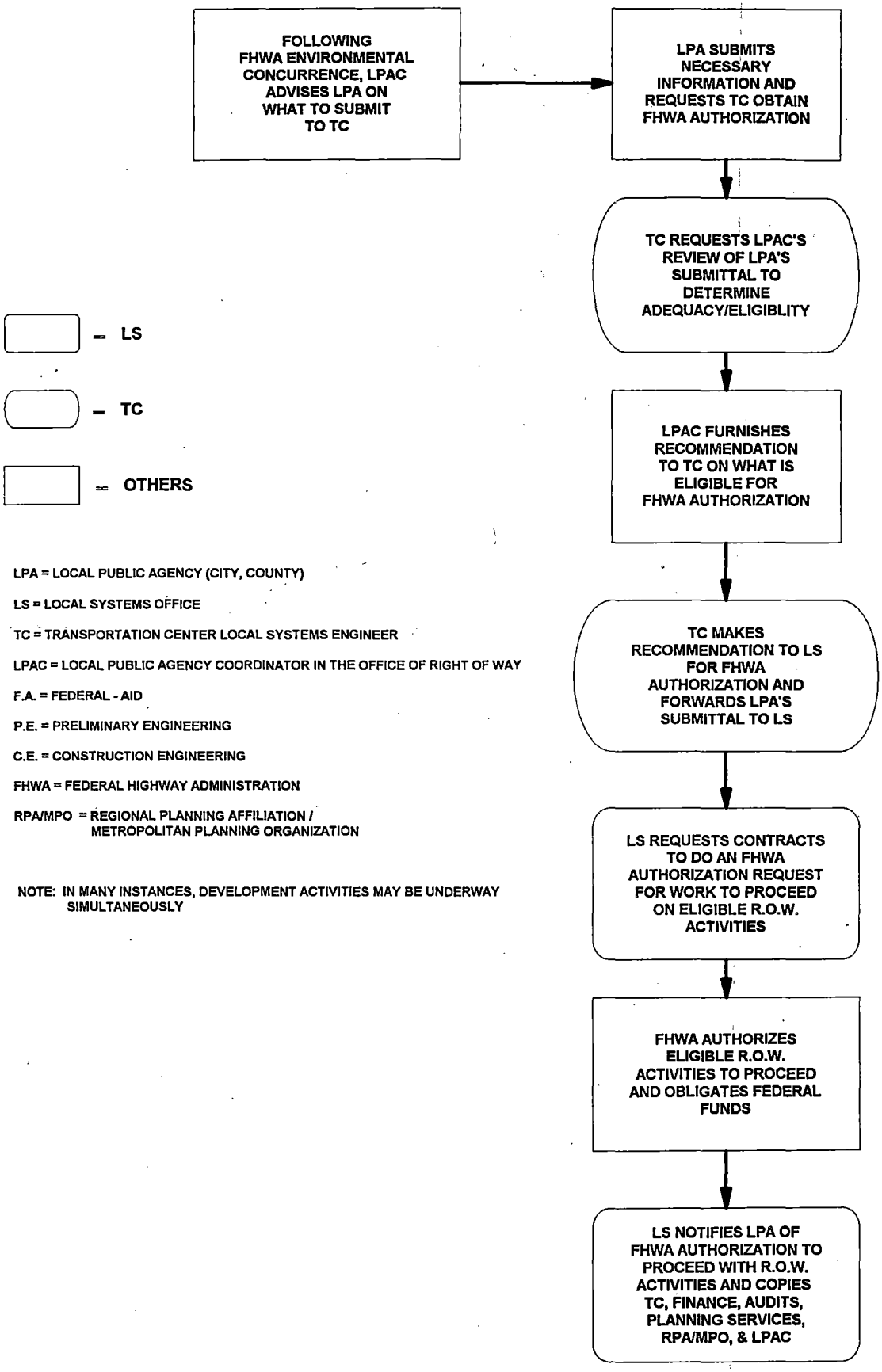
P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

TS &L = TYPE, STRUCTURE AND LOCATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

FEDERAL-AID R.O.W. AUTHORIZATION & OBLIGATION PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

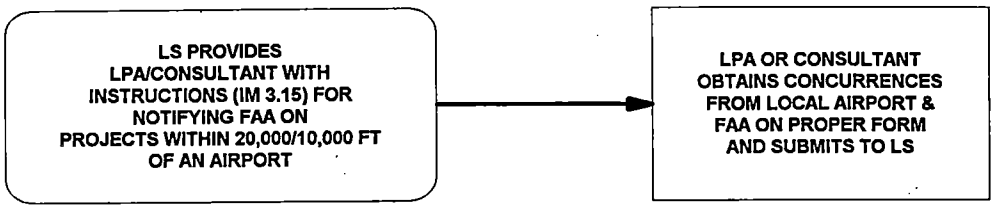
C.E. = CONSTRUCTION ENGINEERING

FHWA = FEDERAL HIGHWAY ADMINISTRATION

RPA/MPO = REGIONAL PLANNING AFFILIATION / METROPOLITAN PLANNING ORGANIZATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

AIRPORT CLEARANCE PROCESS



= LS

= TC

= OTHERS

LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

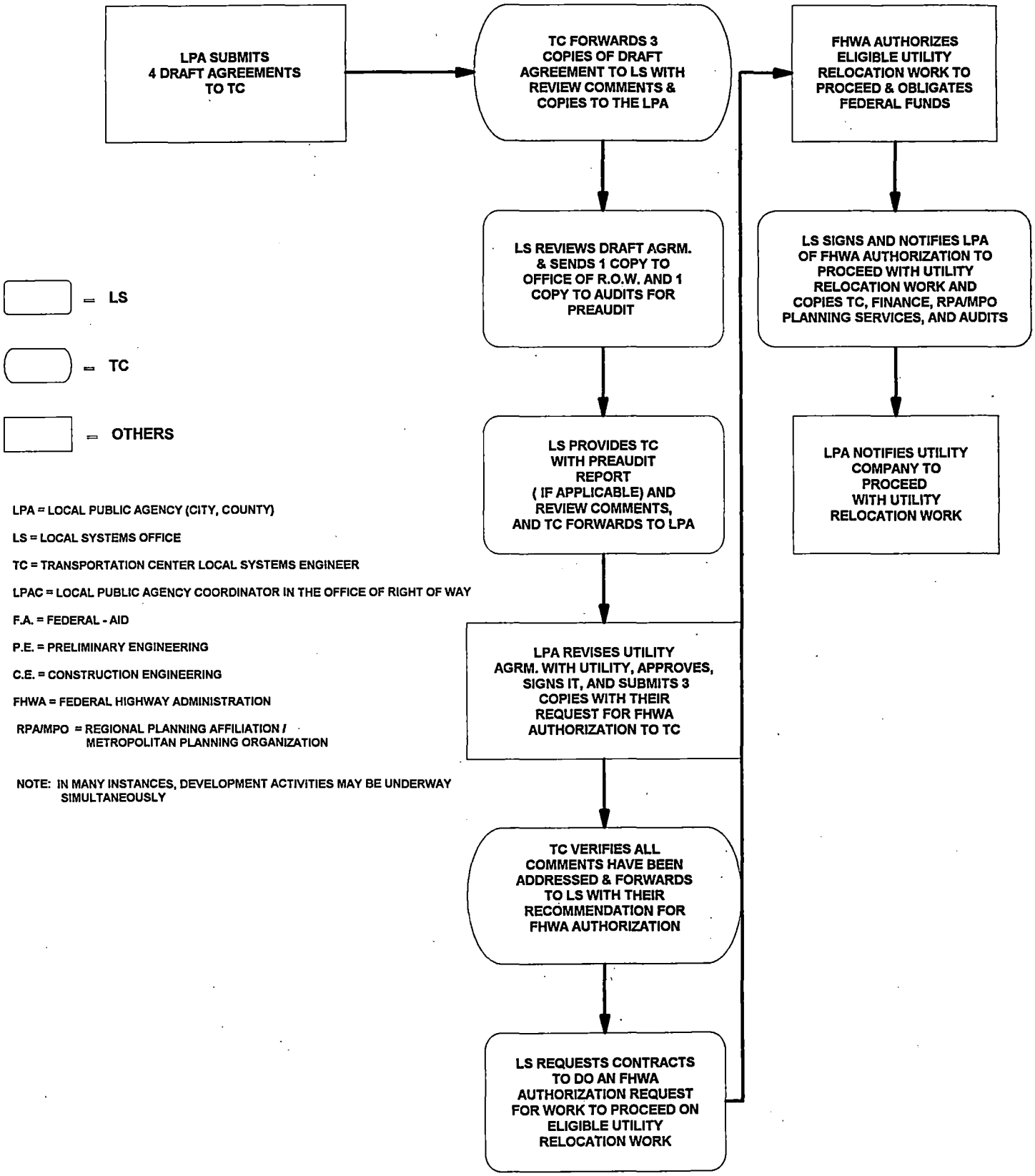
C.E. = CONSTRUCTION ENGINEERING

FAA = FEDERAL AVIATION ADMINISTRATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

FEDERAL-AID UTILITY RELOCATION AGREEMENT

AUTHORIZATION & OBLIGATION PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

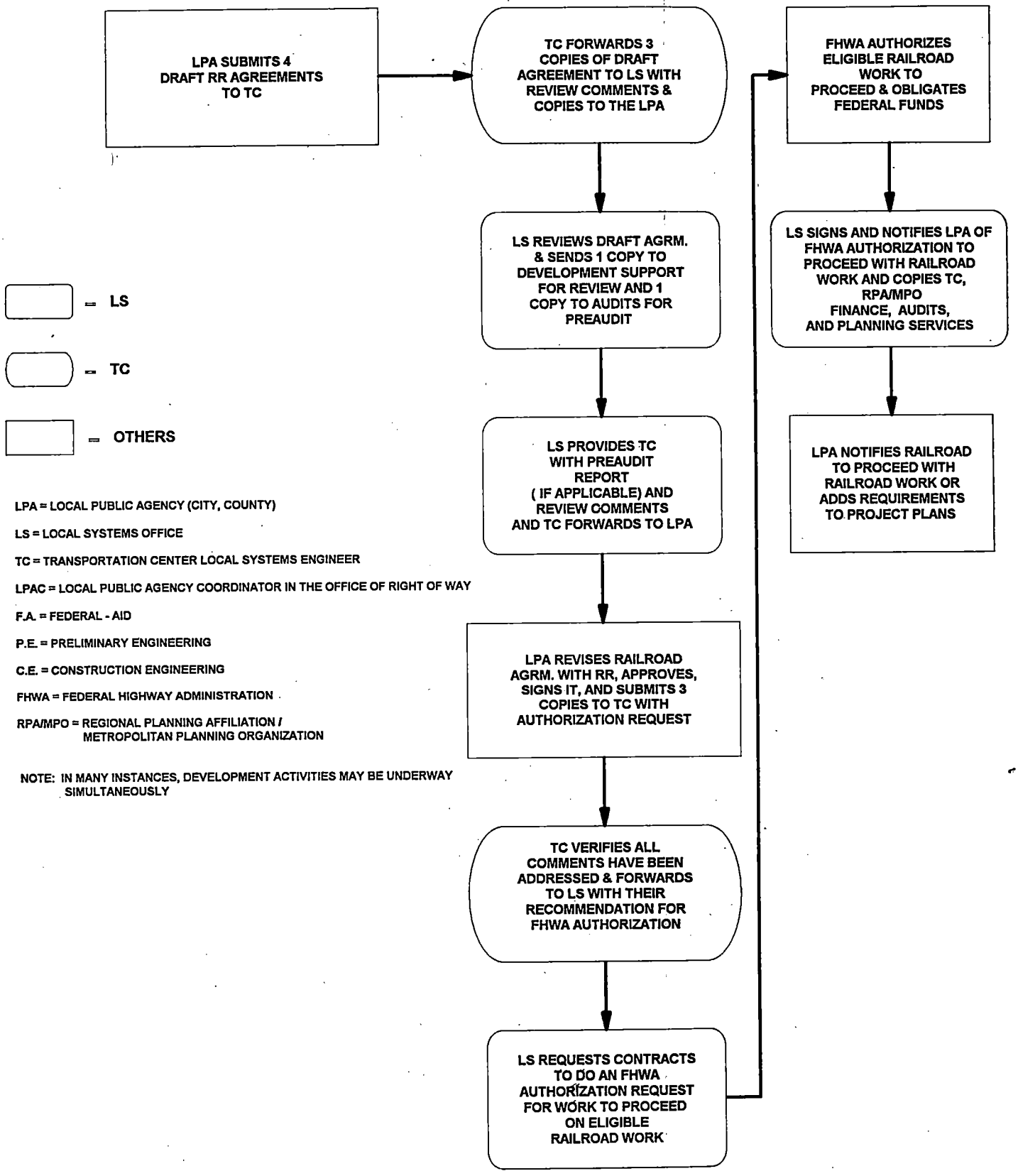
FHWA = FEDERAL HIGHWAY ADMINISTRATION

RPA/MPO = REGIONAL PLANNING AFFILIATION / METROPOLITAN PLANNING ORGANIZATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

FEDERAL-AID RAILROAD AGREEMENT

AUTHORIZATION & OBLIGATION PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

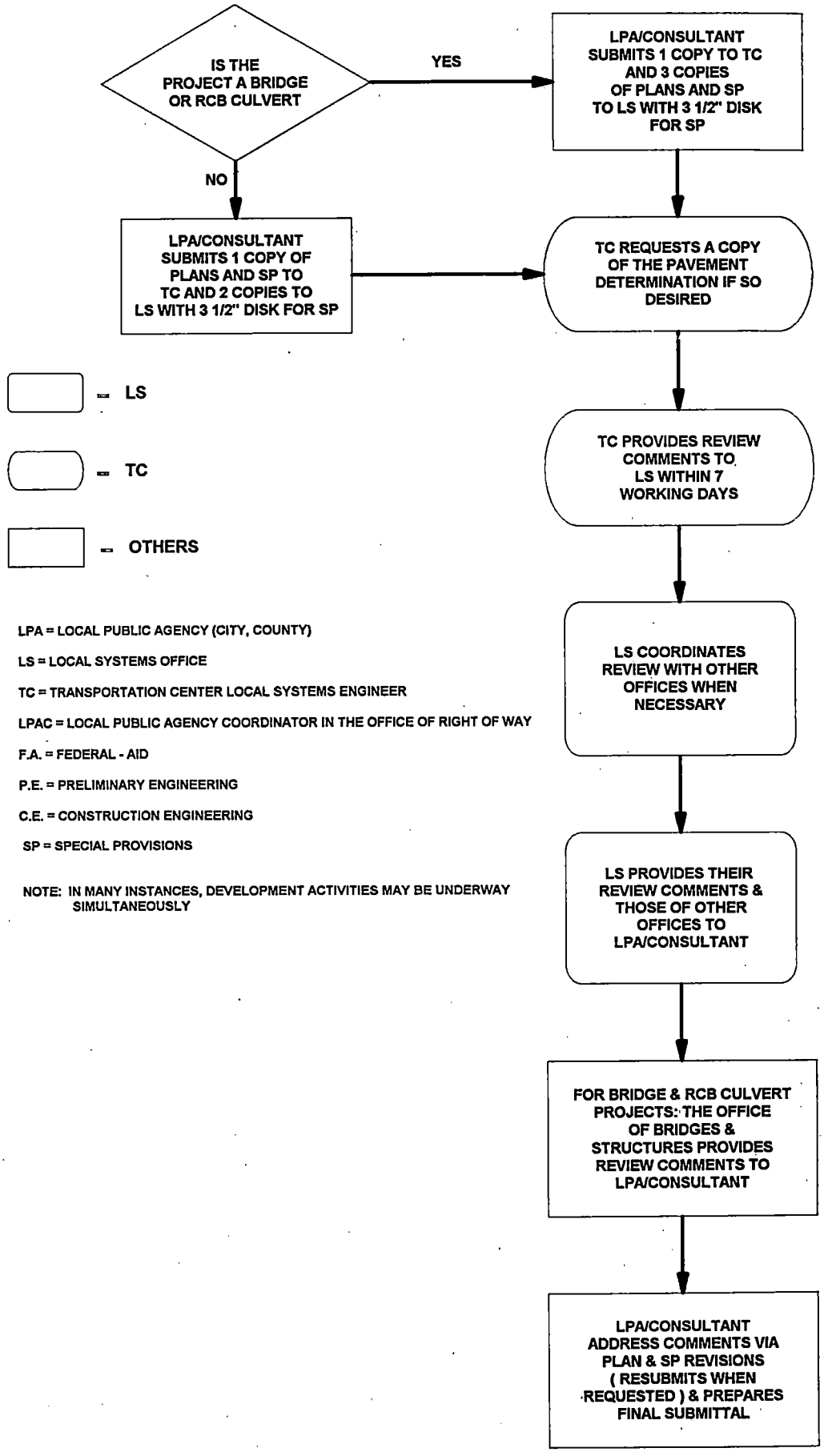
C.E. = CONSTRUCTION ENGINEERING

FHWA = FEDERAL HIGHWAY ADMINISTRATION

RPA/MPO = REGIONAL PLANNING AFFILIATION / METROPOLITAN PLANNING ORGANIZATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

CHECK PLAN PROCESS



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

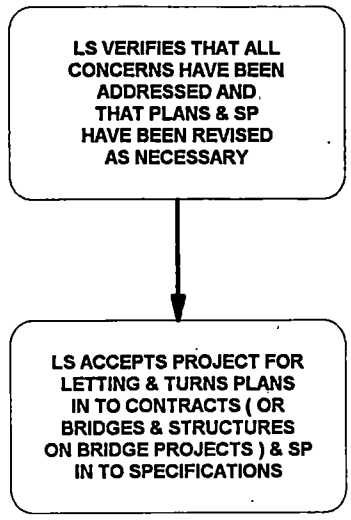
P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

SP = SPECIAL PROVISIONS

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

LETTING SUBMITTAL PROCESS



= LS

= TC

= OTHERS

LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

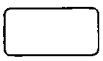
P.E. = PRELIMINARY ENGINEERING

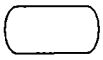
C.E. = CONSTRUCTION ENGINEERING

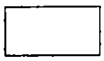
SP = SPECIAL PROVISIONS

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

PROJECT DEVELOPMENT CERTIFICATION FORM PROCESS







LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

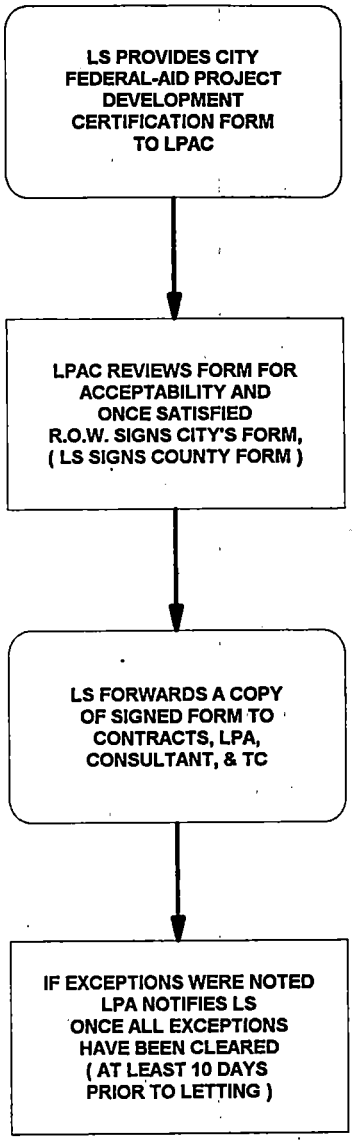
LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

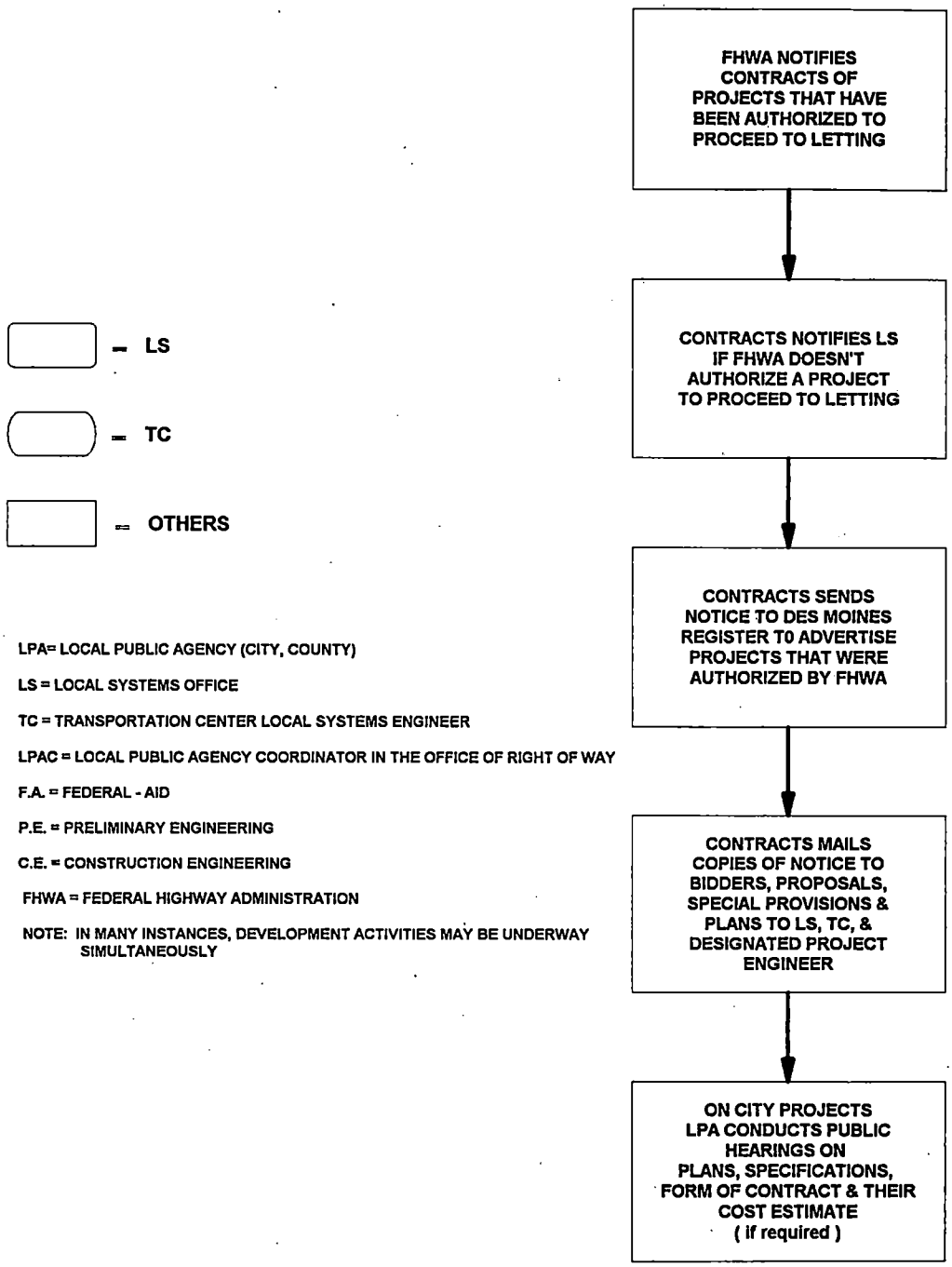
P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY



PRE-LETTING PROCESS



LPA= LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

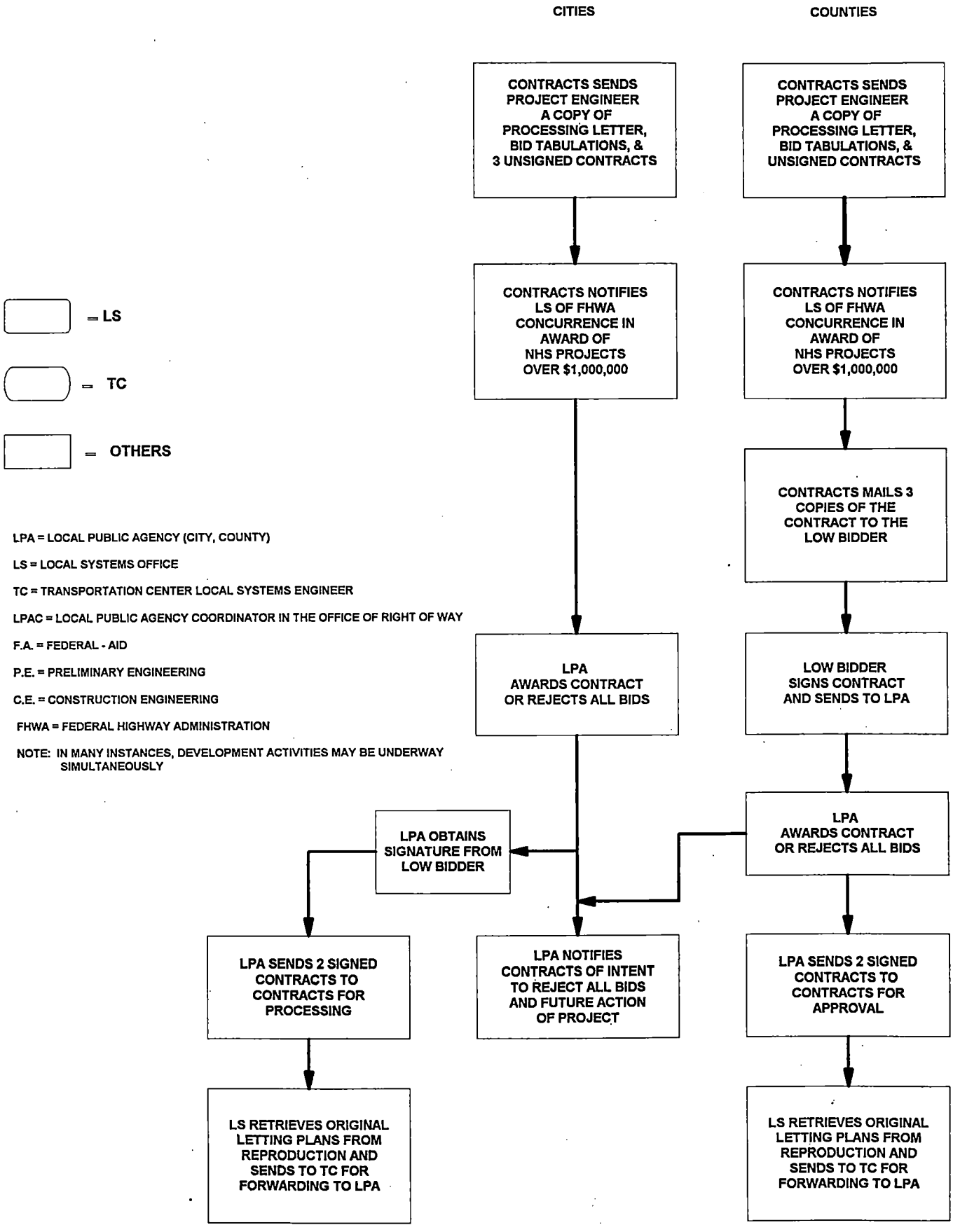
P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

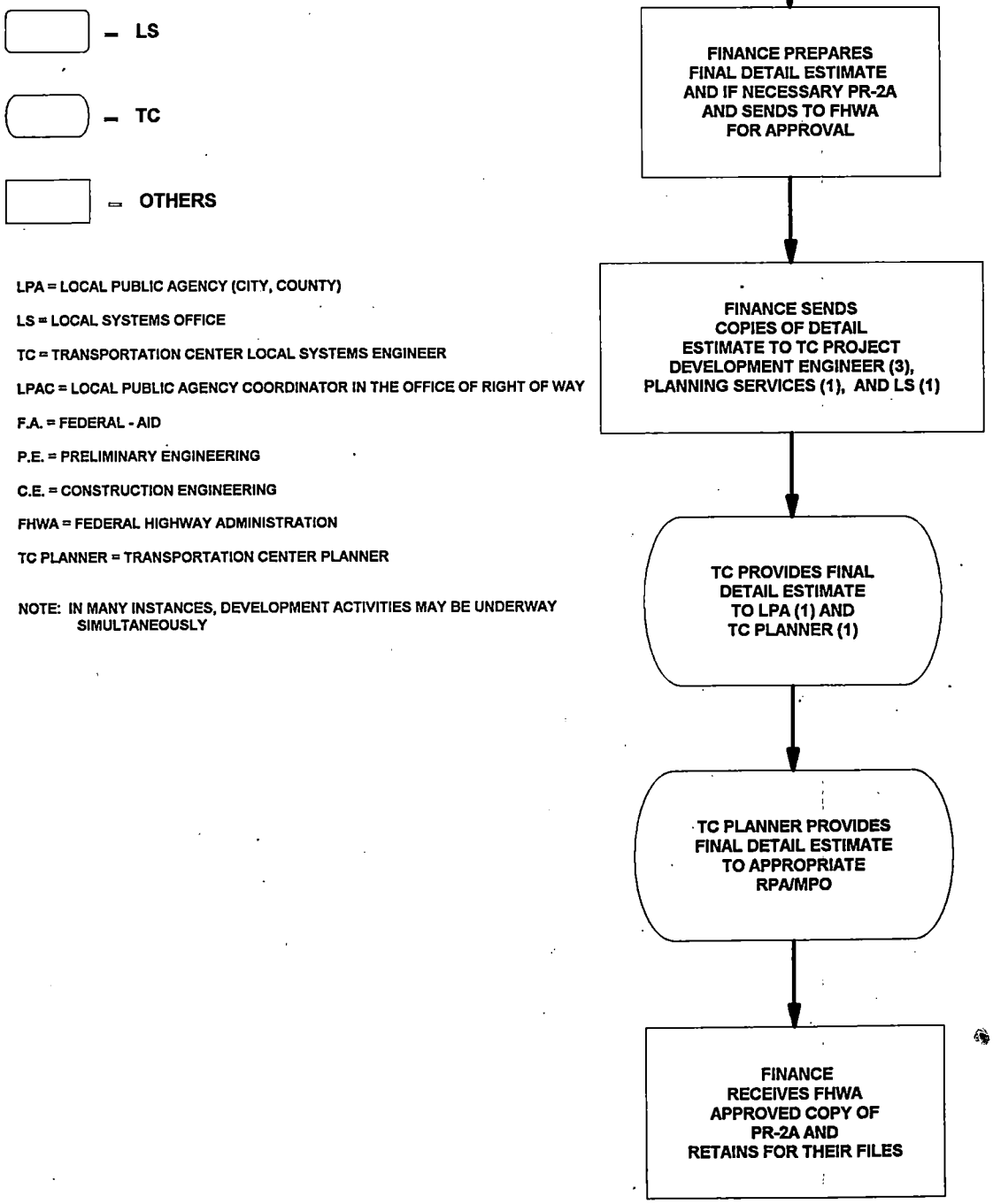
FHWA = FEDERAL HIGHWAY ADMINISTRATION

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

LETTING THRU AWARD PROCESS



PR-2A PROCESS
(Federal-Aid Project Agreement)



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

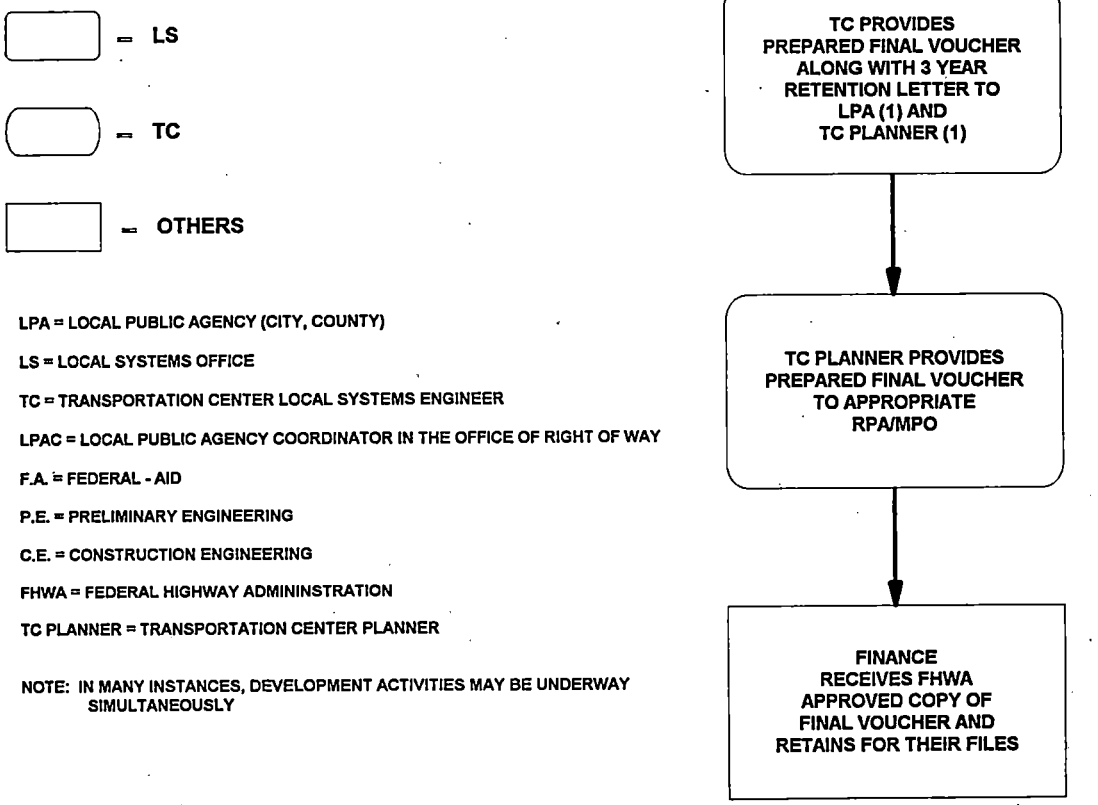
FHWA = FEDERAL HIGHWAY ADMINISTRATION

TC PLANNER = TRANSPORTATION CENTER PLANNER

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

FINAL VOUCHER PROCESS

(PR-20, FHWA - 1447)



LPA = LOCAL PUBLIC AGENCY (CITY, COUNTY)

LS = LOCAL SYSTEMS OFFICE

TC = TRANSPORTATION CENTER LOCAL SYSTEMS ENGINEER

LPAC = LOCAL PUBLIC AGENCY COORDINATOR IN THE OFFICE OF RIGHT OF WAY

F.A. = FEDERAL - AID

P.E. = PRELIMINARY ENGINEERING

C.E. = CONSTRUCTION ENGINEERING

FHWA = FEDERAL HIGHWAY ADMININSTRATION

TC PLANNER = TRANSPORTATION CENTER PLANNER

NOTE: IN MANY INSTANCES, DEVELOPMENT ACTIVITIES MAY BE UNDERWAY SIMULTANEOUSLY

II INDIVIDUAL PROCESSES, GUIDELINES AND FORMS

1. STEPS IN THE FEDERAL-AID CONSULTANT SELECTION PROCESS

TYPES OF PAYMENT METHODS

QBS: A GUIDE FOR SELECTING AN ARCHITECT OR ENGINEER FOR PUBLIC OWNER

GUIDELINES FOR THE DEVELOPMENT OF FEDERAL-AID AGREEMENTS BETWEEN LOCAL PUBLIC AGENCIES AND CONSULTANTS

SAMPLE CONSULTANT AGREEMENT

November 1997

STEPS IN THE FEDERAL-AID CONSULTANT SELECTION PROCESS

BOLD TYPE = LOCAL PUBLIC AGENCY (LPA) RESPONSIBILITIES

LPA = City or County

ITALICIZED TYPE = OTHER'S RESPONSIBILITIES

1. **LPA shall prepare a scope of work that reflects a description of the design services to be requested and a cost estimate. If the cost estimate for consultant work is less than or equal to $50,000 go to Step 2, if over $50,000 go to Step 6.**

2. **LPA shall obtain a list from the Transportation Center Local Systems Engineer (TC) of consultants which are prequalified with the Iowa DOT in the categories of work required.**

3. **LPA shall identify at least 3 firms from the list to be considered for the desired services. If the LPA is interested in a firm not on the list, then go to Step 6.**

4. **LPA may hold discussions with an adequate number of prequalified firms as necessary to evaluate such items as any changes in qualified staff, workload, willingness to meet time requirements, possible Disadvantaged Business Enterprise (DBE) goal, past performance, accounting methods, and approach to the project.**

5. **If after discussions the LPA feels they can negotiate an agreement with a prequalified consultant at a cost less than or equal to $50,000, then submit the request to the TC and go to Step 16.**

6. **LPA appoints selection committee. Suggest 3 to 5 members who may be LPA staff, council person, board of supervisors, or mayor, and at least one member with technical expertise (i.e. Licensed Professional Engineer such as City/County Engineer).**

7. **LPA submits selection committee membership and method of appointment to TC. LPA requests authority to proceed with selection process and requests TC furnish a list of consultants pre-qualified for the type of services desired.**

8. *TC approves request and forwards prequalified consultant list plus sample Request for Proposal (RFP) to the LPA.*

9. **LPA prepares draft RFP that includes: scope of services needed; the evaluation criteria (should include DBE factor) and the relative weight for each factor; the method of payment preferred (i.e., normally either lump sum or cost plus fixed fee); the proposed DBE involvement goal (10% is target); and the deadline date for receiving proposals. LPA submits RFP to TC for concurrence.**

10. *TC reviews and concurs once satisfied.*

11. LPA sends qualification based RFP to three or more consultants. DBE consultants listed in categories of work required shall be included.

12. LPA's selection committee evaluates proposals utilizing evaluation criteria.

13. LPA's selection committee may conduct interviews if appropriate (usually no more than top 3 firms), applies evaluation criteria and finalize rankings.

14. LPA submits consultant rankings to TC and requests approval to initiate negotiations with number 1 ranked consultant.

15. LPA informs those consultants that submitted proposals of the results of the selection process.

16. TC reviews and concurs once satisfied.

17. LPA prepares estimates of types of labor required, work hours and total costs prior to negotiation.

18. LPA negotiates prime agreement, including tasks, estimated hours, and DBE involvement, with selected consultant. If negotiations with number 1 firm are not successful, initiates the process with the number 2 rated firm. Submits 2 copies of draft agreement prepared by consultant, including subconsultant agreements to TC for review.

19. TC reviews draft agreement(s) and forwards 2 copies (1 containing their comments) to the Office of Local Systems (LS).

20. LS requests External Audits to conduct a pre-audit of the draft agreement(s) if necessary. Pre-audit is not required when the draft agreement is under $50,000 unless:

(a) There is insufficient knowledge of the consultant's accounting system,

(b) There is previous unfavorable experience regarding the reliability of the consultant's accounting system, or

(c) The contract involves procurement of new equipment or supplies for which cost experience is lacking.

If there are any questions on whether conditions a, b, or c, exist, the LPA, TC or LS may contact External Audits for assistance in determining if a pre-audit is needed.

21. Office of External Audits conducts pre-audit (if requested) of draft agreement(s) and forwards report to LS.

22. LS adds their comments to the marked-up draft agreement from the TC and forwards to TC along with 3 copies of the pre-audit report, if conducted.

23. *TC forwards 2 copies of pre-audit report, if conducted, along with TC's and LS's comments on draft agreement(s) to LPA.*

24. **LPA modifies agreement(s) when necessary to address pre-audit, if any, and other comments and submits to City Council, County Board of Supervisors or County Conservation Board for approval.**

25. **Consultant/LPA execute three (3) copies of the prime agreement and LPA forwards to TC along with three (3) copies of each subconsultant agreement.**

26. *TC verifies all concern/comments have been addressed and forwards three (3) originals of the agreement(s) to LS with their recommendation for FHWA authorization.*

27. *LS requests that the Office of Contracts obtain FHWA authorization, and provides Contracts with the DBE estimated dollar involvement.*

28. *Office of Local Systems Urban Systems Engineer or Secondary Roads Engineer signs/dates the prime agreement "Accepted For Authorization" if Federal funds to participate in financing the project have been approved by the LPA's MPO/RPA and if funds are programmed for the current fiscal year in the STIP.*

29. **After FHWA authorization for work to proceed, LS notifies the LPA and TC of effective date of authorization.**

30. **LPA issues notice to proceed and requests copies of executed subconsultant agreements, if no previously obtained, and forwards to TC (1) and LS(3).**

31. *LS distributes copies of the authorized agreement(s) and FHWA authorization to the LPA (2 originals), TC (1), Finanace (1), External Audits (1), and LS's file (1 original). LS sends copies of the PR-2A obligation forms or intent to bill notice (enhancement), to the LPA, TC, Planning Services and appropriate MPO/RPA.*

32. **An LPA official shall act as the Contract Officer and be responsible for administration of the agreement. The TC shall serve as the Contract Monitor. The Contract Officer's approval and the Contract Monitor's concurrence is required on all matters regarding contract administration.**

33. *TC processes the billings received from the LPA for reimbursement.*

34. *Upon completion, TC requests final audit or a final review from External Audits. Lump Sum Consultant agreements do not need a final audit but may have a final review. External Audits may waive final audit requirements on agreements less than $50,000. Final payment for lump sum agreements or hourly rate agreements under $50,000, can be made prior to final audit or review (reimbursement set by agreement).*

35. *Accounting sends copies of prepared form FHWA-1447 to TC (3), LS (1), and the Office of Planning Services (1). TC distributes to the LPA and MPO/RPA.*

November 1997

FEDERAL-AID CONSULTANT AGREEMENTS
TYPES OF PAYMENT METHODS

Cost-plus-Fixed-Fee: By this method, the consultant is reimbursed for actual documented costs incurred and receives in addition a predetermined fixed fee. This method of payment is appropriate when the scope, complexity, character, and duration is indeterminable at the time of negotiations, or where the work is of a nature that the State does not have experience or knowledge to permit an evaluation of the consultant's proposal on any other basis. This method requires, as a prerequisite to equitable negotiations, that the contracting authority and consultant define as fully and completely as possible, and agree upon, the scope of services.

Lump Sum: By this method, the consultant undertakes to perform the services stated in the agreement for an agreed amount as full compensation. This method of payment is appropriate only if the Contracting Authority has established the scope, complexity, and time duration of the work required to a degree that just compensation can be determined and evaluated by all parties at the time of negotiations. The proposed lump sum agreement should be accompanied by a copy of an estimate prepared by the consultant showing estimated direct and indirect costs the firm expects to incur and the expected net fee. This method would be most appropriate for use on small and repetitious items of work of no more than 18 months in duration.

Specific Rates of Compensation: By this method the consultant is paid at an agreed and supported specific fixed hourly or daily rate for each class of employees directly engaged in the work. Such rates of pay include the consultant's estimated costs and net fee. It should be considered only for relatively minor items of work of indeterminable extent over which the Contracting Authority maintains control of the class of employee to be used and the extent of such use. The specific rates of compensation should be supported by documentation identifying the direct salary costs, salary additives, indirect costs and the net fee. Other direct costs may be set forth as an element of the specific rate or may be included as independent cost items. The specific rates so determined should be established by the consultant and found by the Contracting Authority to be reasonable and proper.

Unit Prices: By this method, the consultant is paid on the basis of the work performed. A unit of work may be defined as a measurement of work, such as linear feet of borings, number of right-of-way plats, etc. This method is appropriate when the cost of the work per unit can be determined in advance with reasonable accuracy, but the extent of the work is indefinite. A proposal utilizing this method of payment should be supported in the same manner as that for the lump sum method.

It is noted, for the aforementioned contract types, according to the Federal-Aid Policy guide, 23 CFR 172, fixed fees normally range from 6 to 15 percent of total direct and indirect cost.

November 1997

FEDERAL-AID CONSULTANT AGREEMENTS

Example of Estimate

Classifications	Hours	Rate	Total
Principal		@	
Project Manager		@	
Design Engineer		@	
Drafter		@	
Technician		@	
Clerical		@	
Total Direct Labor			
Overhead — Payroll Burden			
Overhead — General & Administrative			
Direct Expenses:			
Estimated Actual Cost (Prime)			
Fixed Fee (Prime)			
Contingency (Prime)			
Subconsultant			
Maximum Amount Payable			

It is recommended that this type of estimate be submitted for all lump sum, cost-plus-fixed-fee, salary cost times a mulitiplier plus direct expenses, and incentive type contracts.

Classification: Labor classifications should match those used by the consultant.

Hours: Hours should represent estimated hours by classification to complete the work.

Rate: Rates should represent current rates that can be verified to the payroll register.

Overhead Rate: Overhead rate should normally be estimated at the last verified rate. Under circumstances where the last verified rate is more than 2 years old or where the last verified rate is not representative of the current business trend, an attempt should be made to negotiate a rate taking these circumstances into account. A three year average may be an acceptable alternative.

Direct Expenses: Direct expenses should be estimated by classification/category of expense. Categories can include but not limited to: CADD, computer, mileage, printing, telephone, blue printing, copying, meals and lodging. All direct expense categories estimated by the consultant need to be estimated and charged consistently to all types of agreements to be eligible for reimbursement on our agreement.

Fixed Fee: Fixed fees normally range from 6 to 15 percent of the estimated total of direct labor and overhead.

Contingency: Contingency is normally at 10 percent of the prime's estimated cost of direct labor, overhead, and direct expenses. Under circumstances where the scope is not well defined it may be appropriate to increase the amount of contingency. Contingency is normally used to cover increases in wage rates and overhead and under some circumstances to cover a limited amount of unforeseen costs. Allowance for contingency on lump sum agreements is not appropriate.

Subconsultant: Subconsultant expense should represent estimated cost of work to be completed by an identified subconsultant. The subconsultant should submit an estimate similar to the prime's so the sub's expenses can be reviewed in the same manner as the prime's. Estimated amount should include direct labor, overhead, direct expense, fixed fee and contingency.

QUALIFICATIONS-BASED SELECTION

QBS: A Guide for Selecting an Architect or Engineer

For Public Owners

This manual has been prepared by a joint committee of the American Institute of Architects, Iowa Chapter the Consulting Engineers Council of Iowa, and the Iowa Engineering Society. It has been adapted from guidelines in use in other states, and from their experience with the QBS process.

Questions and comments should be addressed to:
American Institute of Architects, Iowa Chapter
1000 Walnut Street, Suite 101
Des Moines, IA 50309
(515) 244-7502
FAX (515) 244-5347

THE AMERICAN INSTITUTE OF ARCHITECTS

Iowa Engineering Society and
Consulting Engineers Council of Iowa
1051 Office Park Road, Suite #2
Des Moines, IA 50265
(515) 223-0309
FAX (515) 223-0396

Iowa Engineering Society

Consulting Engineers Council of Iowa

Table of Contents

What is QBS?

Qualifications-Based Selection (QBS) is an objective, flexible procedure for obtaining architectural, engineering, land surveying, and other related professional design services for public projects. It assists the owner in the selection process if the owner does not already have a professional design consultant. The QBS process is helpful to frequent users of design services as well as one-time users with little or no past experience in working with design professionals. QBS provides owners with a selection process that is straightforward and easy to implement, is objective and fair, can be well documented, and is open to public scrutiny.

QBS assists the owner in the selection process if the owner does not already have a professional design consultant.

The QBS process recognizes that design professionals play a critical role in the public building process. The quality of the services provided by the architect or engineer is the single most important factor in determining the overall construction costs and life-cycle costs of a building.

As the first steps in the construction process, pre-design and design dictate everything that follows: the size and layout of the facility; its aesthetic character and relationship to its surroundings; the type of construction materials; capacity of mechanical and electrical systems; and other factors. It is unfortunate but true, that not even the best contractor using the finest materials can overcome the affects of poor design.

Professional design services represent only a small percentage of the construction budget, and a smaller percentage of the life-cycle, so it is in the best interest of the taxpayer to ensure that the most qualified firms are selected for public projects.

This manual will tell you, in detail, how to select and retain an architect or professional engineer using the QBS process.

Why use Qualifications-Based Selections?

Every construction project is unique, with its own technical challenges. Yet, at the outset of most projects, the owner often does not fully grasp the complexities of the project nor the variety of design services that will be required in order to transform the generalized concept into reality.

In the construction process, the architect or engineer serves as the agent of the owner, representing the owner's interests in day-to-day dealing with governmental agencies, contractors, suppliers, equipment manufacturers, and others providing services and regulatory reviews and approvals of the project. For this reason it is vital that the owner and architect/engineer share a professional relationship characterized by trust, respect and effective communication.

Qualification-Based Selection fosters this type of relationship by bringing the owner and design professional together as a team, enabling them to define the project scope in detail and agree upon the services that will be required to make the project a reality. No wonder, then, that QBS is the most widely endorsed method for selecting professional design consultants.

Since 1972, all agencies of the federal government have been required to use the QBS procedure for selecting design professionals. This traditional, qualification-based approach to procuring architectural and engineering services on publicly funded projects was codified into law (P.O. 92-582) in 1972 by the U.S. congress. The law requires that architects and engineers be selected for all federal government projects on the basis of qualifications, subject to negotiation of fair and reasonable compensation. Nearly forty states now

mandate the use of a similar procedure.

In recommending the use of Qualification-Based Selection by state and local governments, the American Bar Association says:

> "The principal reasons supporting this selection procedure for architect, engineer and land surveying services are the lack of a definitive scope of work for such services at the time the selection is made, and the importance of selecting the best qualified firm. In general, the architect, engineer or land surveyor is engaged to represent the (states) interest and is, therefore, in a different relationship with the (state) from that normally existing in a buyer-seller situation. For these reasons, the qualifications, competence, and availability of the most qualified architect, engineer or land surveyor firms is considered initially, and price negotiated later."

QBS is the most commonly used means of selecting design service for public contracts.

How Qualifications-Based Selection Works

The QBS process usually involves the following steps:

1. The owner prepares a preliminary scope of work — that is, the owner describes the project to be built or the problem to be solved.

2. The owner invites design professionals to submit statements of qualifications for the project at hand.

3. Statements of qualifications are evaluated, and several firms are selected, or, "short-listed" for further consideration.

4. The firms are then interviewed and ranked according to a scoring system.

5. The top-ranked firm is notified of its selection for the project, and the owner and selected firm open discussions leading to agreement on a final scope of services and a contract between the two parties.

These steps are described in detail in the pages that follow.

1 Developing the Preliminary Scope of Work

To begin the selection process, the public owner should prepare a written description of the project. Just as the owner needs information about the experience and qualifications of the design professional firms, the firms need to know the project requirements and goals.

When the scope of work is properly written and communicated, it saves time, money, and effort for both the owner and the design professional. A well defined scope of work helps the design firms decide if they are capable and qualified to perform the work, and allows them to tailor their statements of qualifications directly to the project requirements; and provides the owner with a uniform basis for evaluating the responses.

ELEMENTS OF THE PRELIMINARY SCOPE OF WORK

The following are the basic elements that, whenever possible, are to be included in a preliminary scope of work:

- Project name or identification and planned location.

- Project outline, including the intended size, function, and occupancy; and other general requirements, e.g., renovation, demolition, additions, new construction, energy, land use, and site selection considerations.

- Estimated construction budget and anticipated funding sources.

- Description of completed feasibility studies, surveys, or other preliminary information that is relevant to the project and available for review.

• Anticipated project schedule, including completion of design work, beginning of construction, and planned completion date.

• Unique requirements or restrictions such as zoning or environmental problems.

• Specific services to be provided, such as feasibility studies, program development, design, construction observation or management, budget development.

A model of a preliminary project scope of work is included in the back of this manual as *Appendix A*.

2 Requesting Statements of Qualifications

After the owner has prepared a preliminary scope of work, the next step in the QBS process is to invite firms to submit professional resumes, or statements of qualifications.

At this point, the owner must decide whether the invitation will be open to all interested firms, or whether this information will be solicited from a more select group of firms.

Some government agencies are required to advertise their intent to contract for design services and to permit all interested firms to submit a statement of qualifications. Other agencies maintain files on professional design firms and offer their projects only to these firms.

An easy way of identifying firms that would be interested and qualified for your project is to obtain directories of Iowa firms.

An easy way of identifying firms that would be interested and qualified for your project is to obtain directories of Iowa firms — architectural firms from the Iowa Chapter of the American Institute of Architects, and engineering firms from the Consulting Engineers Council of Iowa.

CONTENTS OF THE INVITATION TO SUBMIT QUALIFICATIONS

Whether the invitation to submit statements of qualifications takes the form of a public advertisement or a letter or memorandum sent to a limited number of firms, it should include the following:

• The preliminary scope of work for the project.

• The project owner's name and the name, address and phone number of the owner's project representative.

• A list of information each firm should include in its statement of qualifications, such as name of the firm, brief history of firm, services to be provided by firm, services provided by consultants, background on key personnel, experience on relevant projects designed by the firm, projects underway, etc.

• The deadline for submitting statements of qualifications.

• A request for references.

See *Appendix B* for a model of an invitation to submit statements of qualifications.

3 Evaluating the Statements of Qualifications and Developing a Short List

The ultimate goal of this evaluation is to narrow the field of qualified firms to a "short list." The number of firms to be short-listed usually relates to the size and complexity of the project. Each firm should be evaluated on factors of importance to the owners. These may include experience, expertise of its key professional staff, its physical equipment and facilities, and references.

This evaluation can be conducted by one individual or

a committee appointed by the owner. (Governmental ...ncies often have specific rules or policies regarding ...e make-up of selection committees.) The most important consideration is that the person or persons performing the evaluation are fair and competent and have the authority to make an intelligent selection decision.

A sample tally sheet such as is normally used in the evaluation of the statements of qualifications is included as *Appendix C.* Frequently, an owner will attach more importance to certain firm qualifications than others. This form should be tailored to meet those concerns simply by assigning a higher arithmetic weight to those factors that are of greatest concern to the owner. It benefits the client if the design professional knows what is important to the client. Therefore, it is beneficial to share the weighted tally sheet with the design professional.

Before meeting to perform evaluations, the owner should check the references of each firm under consideration. This check should not be limited to the references supplied by the firms. A model form to aid in ...e checking of references is included as *Appendix D.*

ARRIVING AT THE SHORT LIST

Based upon the evaluation of the statements of qualifications and reference checks, the public owner can establish a short list of firms for further consideration. Because all firms that submit a statement of qualifications make a significant commitment of time and expense in pursuing the project, as a courtesy, the owner should notify the firms not selected for further consideration, as well as those who were short-listed.

A model of a memo of thanks to firms not selected for further consideration is included as *Appendix E.*

4 Evaluating and Ranking the Short-Listed Firms

...e interviews of the short-listed firms give the public owner an opportunity to compare the firms' different approaches to the design process as well as their interpretations and understanding of the specific project requirements. Almost as important, they provide an insight into each firm's management style and communications abilities. For this reason, it is imperative that the professional personnel to be assigned to the project team, as well as key consultants, be present at the interview. It is also essential for the project users to be involved in the interview process. Direct interaction between owner/user and the design professional is essential for the development of a design that truly meets the owner's needs.

The size of the project may determine the number of representatives a design professional has at an interview.

PRE-INTERVIEW TOURS OF THE PROJECT SITE

The size and complexity of the project should determine the necessity of a tour. Providing interested firms with a group tour of the project site is optional, but can be one of the most important parts of the selection process. A tour of the project site gives the firms the opportunity to obtain first-hand information about the proposed project and helps them to prepare for the interviews.

(Note: In order to avoid proprietary, or inconsistent information, it may be desirable that the architect/engineer be directed to talk only with the owner's representative.)

A model memo to short-listed firms, outlining interview and tour arrangements and setting out evaluation criteria to be utilized, is included as *Appendix F*

INTERVIEW ROOM SET-UP

The physical set-up for the interview should be comfortable, with good acoustics and ample room. A separate area should be provided for firms waiting to be interviewed. Equipment such as blackboards, flip charts, and audio visual screens will be useful if available. Most firms will bring their own equipment to present their information. Since equipment set-up time may cause some delays in the interviewing process, two rooms should be used if possible. While one firm is being interviewed in the first room, another firm can set up for its presentation in the second room, thereby facilitating the process and ensuring that important interview time is not spent checking equipment.

SOME INTERVIEWING GUIDELINES

The following are suggested guidelines for setting up and conducting the interviews:

- Allow approximately 45 minutes for each interview and 15 minutes between interviews. This should allow ample time for presentations and a question-and-answer period, and for committee members to discuss the presentations among themselves before beginning the next interview.

- Schedule all interviews on the same day. This permits the committee to compare all of the interviewed firms while the information is fresh in their minds and ensures consistent interview scoring.

If the fee proposed is more than the owner has budgeted, the two work together to modify the scope of services, so that the owner is fully aware of limitations or problems that might result.

- Most interviews are held in a closed session. If ordinances or regulations require that the interviews be conducted publicly, the firms should be notified of this.

- While it is appropriate to question firms about how they would approach the design of a project, owners should not ask for an actual design solution during the interview. Appropriate and responsive designs require considerably more interaction between the owner and designer than is possible during the selection phase. If either the owner or the design professional comes to the interview with a preconceived design solution, considerable time and energy will have been expended to get to this point. This may inhibit further creativity and prevent other, perhaps better, solutions from being explored.

THE RANKING AND EVALUATION PROCESS

After all short-listed firms have been interviewed, and, if possible, at the conclusion of the interview day, each firm should be evaluated by the owner or the members of the selection committee.

The form used to evaluate and rank the short-listed firms should enumerate the various criteria that are of importance to the owner, and a maximum numeric value should be assigned to each criteria. A model evaluation form is included as *Appendix G.*

If one individual is conducting the evaluations, he or she ranks the firms, highest to lowest, according to their total scores. When a committee is involved, the chairman should collect the evaluation sheets from the members of the committee. Each firm's scores are then tallied and averaged, and the firms are then ranked from the highest average score to the lowest. A model tally sheet for the final evaluation is included as *Appendix H.* This system provides a documented record of the selection process as support for the selection committee's actions. It is recommended that the selection committee members take the time to achieve the ranking and selection by consensus rather than just by majority vote.

Once the most highly ranked firm has been identified, the firm should be notified of its selection and discussions initiated that will produce the final scope of services and the contract between the owner and the design professional.

After the interviews and rankings are completed, a memo should be sent to all firms that were interviewed. The memo may include all firms interviewed, but should list at least the top two firms in the order they were ranked by the committee. A model post-interview memo is included as *Appendix I.*

You may be contacted by some of the firms to discuss their proposal. It is perfectly acceptable to debrief them on their proposal, but not other firms'.

5 Developing the Scope of Services and Contract

As soon a possible after selection, the owner should begin negotiations with the selected firm. A detailed and comprehensive scope of services should be developed jointly by the owner and the selected firm. This is often accomplished through one or more meetings, and becomes the foundation of the contract between the two parties.

When the detailed scope of services is agreed upon, selected firm is in a position to develop and submit a detailed proposal to the owner. If the fee proposed is more than the owner has budgeted, the two work together to modify the scope of services, so that the owner is fully aware of limitations or problems that might result. Such a working relationship greatly enhances the odds for a successful project.

If an agreement on the scope of services and compensation cannot be reached, negotiations with the first-ranked firm should be terminated, and the owner should initiate talks with the second-ranked firm. However, it is not normally difficult to reach agreement, since the QBS process facilitates an early understanding of the project scope and requirements through the progression of steps involved in the selection.

Given the important nature of the services and the opportunity for misunderstanding, the owner and the design firm should enter into a written contract. The parties may wish to use the standard forms of agreement that have been developed by: The American Institute of Architects (AIA) for architectural services, or by the Engineers Joint Contract Documents Committee (EJCDC) for engineering services. The AIA documents and the EJCDC documents are widely used, time tested, and designed to coordinate the needs of owners, architects, engineers and contractors. There are "short form" agreements which may be suitable for small jobs

ESTABLISHING FEES FOR PROFESSIONAL SERVICES

Owners may want to ask the firm representatives how they arrive at the fees for their professional services. However, specific fee amounts are resolved later, during detailed discussions with the firm selected, after there is a comprehensive and mutual understanding of the actual scope of services to be performed. This ensures that the owners requirements for the project are taken into account in the development of the scope of work, rather than having the scope and fee developed solely by the design firm. This is an area where good and open communication is essential to avoid misunderstandings at a later date.

Compensation for architectural or engineering services is calculated and established by a variety of methods:

Stipulated Sum or Fixed Fee is commonly used when all of the project aims and required services are well-defined and can be mutually agreed upon during negotiation.

Percentage of Construction Cost is used when the parties agree that compensation should relate directly to the cost of construction.

Professional Fee Plus Expenses establishes a fee to cover non-reimbursable expenses, plus compensation for services rendered based on a multiple of direct personnel expense. The fee does not change regardless of variations on cost.

Multiple of Direct Personnel Expense bases compensation upon all direct payroll costs (salaries, benefits, payroll taxes, social security contributions) times a multiplier which compensates for overhead, profit and direct non-salary expenses (travel, communications, supplies). Usually a maximum fee or "not-to-exceed" amount is agreed upon.

The design firm should submit its proposal for compensation to the owner to initiate the negotiations. The method of determining compensation can be a part of these negotiations. The best method of compensation may vary from project to project. No one method is necessarily better than others.

6 Some Final Words about Qualifications-Based Selection

The significant feature of the QBS method is the selection of design professionals on the basis of qualifications and competence, with fee negotiations undertaken with the firm deemed most qualified.

NOTES:

Appendix A *See page 2*

Preliminary Scope of Service *(Model Form)*

Name of Project: _____

Project Owner: _____

Project Location: _____

Contact Person: _____

Address: _____

_____

Phone: _____

Project Description: _____

_____

_____

Estimated Construction Budget: _____

Source of Financing: _____

Project Schedule:

Planned Date of Design Start-up: _____

Planned Date of Construction Start-up: _____

Planned Date of Completion: _____

Site Requirements or Restrictions: _____

_____

_____

Professional Services Required: _____

_____

_____

Attachments:

Feasibility Studies

Land Surveys

Other Information

Appendix B *continued*

LIST OF INFORMATION TO BE INCLUDED IN THE STATEMENT OF QUALIFICATIONS

Your Statement of Qualification should include the following information:

1. Firm name, address, and brief history.

2. Services to be provided by your firm.

3. Services to be provided by outside consultants.

4. Related experience to include:

   a. Projects of a relevant nature, with date of completion.

   b. Projects of a relevant scope, with date of completion.

   c. Examples of project budgeting and cost estimating procedures with results.

5. You may include a maximum of one page of additional information not included above if you feel it may be useful and applicable to this selection process.

NOTE: Any questions regarding the qualification process and project must be directed ONLY to:

Name _____

Title _____

Address _____

Phone _____

OPTIONAL:

1. Include project name, owner's representative and telephone number, and construction dollar amount for each example. Include at least one, but no more than five, slides of each project, submitted in 8-1/2 x 11 transparent sleeves with project identification and firm identification on each slide.
2. Qualifications of key personnel to be assigned to this project. (Note that key personnel may be requested to attend an interview.)
3. All specific questions regarding this project will be answered during the (date) preinterview meeting and tour for (names) to be interviewed, or thereafter by (person).

Appendix C *See page 4*

Evaluation Form for Statements of Qualifications *(Model Form)*

Name of Project: _____

Name of Design Firm: _____

Name of Evaluator: _____

CRITERIA	RATING	WEIGHT	SCORE
I. Firm & Individual Qualifications			
▪ Services to be provided by firm		x	=
▪ Qualifications and experience of principals & key technical personnel		x	=
II. Experience Considerations			
▪ Specific project type experience		x	=
▪ Similar to project type (complexity, size, etc.)		x	=
III. Ability to Perform Work			
▪ Availability of staff		x	=
▪ Projects in progress		x	=
▪ Other considerations		x	=
▪ Services to be provided by outside consultants		x	=
IV. References			
▪ Quality of design		x	=
▪ Ability to meet schedules/deadlines		x	=
▪ Ability to control costs/meet budgets		x	=
▪ Communication/cooperation		x	=
		Total Score	=

Rating Key: 1 = Poor
2 = Fair
3 = Good
4 = Excellent
5 = Superior

Appendix D *See page 4*

Design Firm Reference Check *(Model Form)*

Name of Design Firm _____

Project Referenced _____

Owner _____ Person Contacted _____

Address _____ Telephone _____

1. When was your project completed? _____
2. What services did the firm provide? (design, construction observation, etc.) _____

_____

3. Name of firm's representative you worked with most closely _____

	Poor (1 pt)	Fair (2 pts)	Good (3 pts)	Excellent (4 pts)	Superior (5 pts)
4. Overall, how would you evaluate the quality of work performed by the firm?					
5 How would you rate the firm's performance in terms of meeting schedules and deadlines?					
6 How would you rate the firm's performance in terms of controlling design costs and meeting budgets?					
7. How would you rate the firm's overall attitude and ability to communicate and work cooperatively?					

Enter the ratings from questions 4-7 directly on Statement of Qualifications Evaluation Form, Part IV, "References," on Appendix C.

Appendix E *See page 4*

Memo to Firms Not Selected for Further Consideration *(Model Form)*

TO: (List in alphabetical order all firms not selected for further consideration)

FROM: (Project Owner's Representative)

SUBJECT: (Project Name)

We would like to thank you for submitting your Statement of Qualifications and expressing interest in our project.

After careful consideration of all interested firms, the (name of individual or group responsible for selection) has selected the following firms for further consideration for this project:

1) _____

2) _____

3) _____

While your firm was not selected for further consideration, we appreciate your interest in our project and the effort put forth in preparing and submitting your Statement of Qualifications.

XXX xxx

Appendix F *See page 4*

Memo to Firms Selected for Interview *(Model Form)*

TO: (Name of firm selected for further consideration)

FROM: (Project Owner's Representative)

SUBJECT: (Project Name)

Your firm has been short-listed and will be interviewed for professional design services.

The other firms selected for further consideration are:

1) _____

2) _____

Before making the final selection, we would like to interview representatives of each of the short-listed firms. Each firm will be allowed (number) minutes to make its presentation and answer questions. The interview for your firm is scheduled for

(Time) on (Date) at (Location: Building, address, room #)

During the interview, your firm's representatives should plan to discuss its interpretation of the project requirements; various technical alternatives that might be considered; the key personnel who would be assigned to the project; the firm's experience with similar projects; outside consultants who would be made a part of the design team; project management and cost control techniques; and method of determining compensation for the required services.

Your interview team should consist of key members of the team for our project. Your team should consist of no more than (number) members.

OPTIONAL:
A list of the evaluation criteria to be utilized by the interview team is attached for your information.

We will offer each firm an opportunity to tour the project site before being interviewed. To arrange for a tour, please call (person) at (phone number) no later than (date).
OR
A preinterview meeting and tour of the site has been scheduled for (date) at (time).
All parties meet at (location).

Appendix G *See page 5*

Evaluation Form for Short-Listed Firms *(Model Form)*

Name of Project: _____

Name of Design Firm: _____

Name of Evaluator: _____

	Possible Points	Points Awarded
1. **Grasp of Project Requirements** Firm's analysis, interview preparation & level of interest.		
2. **Design Approach/Methodology** Technical alternatives, creativity, problem-solving ability.		
3. **Project Management** Proposed project schedule cost controls.		
4. **Project Design Team** Subconsultants who would be made part of project design team.		
5. **Key Project Personnel** Qualifications & experience of project manager, other key personnel.		
6. **Responsiveness** Compatibility between design professional and owner, general attitude and ability to communicate.		
7. **Geographic Considerations** Familiarity with locale and local government & regulatory agencies.		
	Total	

Appendix H *See page 5*

Final Evaluation Tally Sheet *(Model Form)*

	Firm A	Firm B	Firm C
Interviewer 1 _____	_____	_____	_____
Interviewer 2 _____	_____	_____	_____
Interviewer 3 _____	_____	_____	_____
Interviewer 4 _____	_____	_____	_____
Interviewer 5 _____	_____	_____	_____
Total Score	_____	_____	_____
Average Score	_____	_____	_____

Appendix I *See page 5*

Memo to Short-Listed Firms, Announcing Final Selection *(Model Form)*

TO: (List alphabetically all interviewed firms)

FROM: (Project Owner's Representative)

SUBJECT: (Project Name)

Following interviews with each of the firms that were short-listed for this project, the interviewers ranked the firms in the following order:

1) _____

2) _____

Throughout this process, it has been our objective to select the firm most qualified to provide the services we require. Accordingly, we have entered into contract negotiations with _____ (most highly ranked firm).

Please accept our most sincere thanks for the time and effort you have expended on our behalf. Perhaps we will have the opportunity to work together on another project in the future.

XXX:xxx

GUIDELINES FOR THE DEVELOPMENT OF FEDERAL–AID AGREEMENTS BETWEEN LOCAL PUBLIC AGENCIES AND CONSULTANTS

Federal–aid consultant agreements:

1. Shall comply with the provisions of 23 CFR part 172 entitled "Administration of Engineering and Design Related Service Contracts" with the exception that a preaudit evaluation is required (by Department Policy No. 300.13) on all agreements that exceed $50,000.

2. Shall clearly define the parties to the agreement.

3. Shall include a project description including project limits (a location map exhibit is encouraged) along with a general description of the services to be performed.

4. Should contain a definition section that identifies terms/pronouns that may be substituted for other terms/nouns.

5. Should contain a section that outlines general agreement provisions and responsibilities.

6. Shall contain a scope of services section that specifically details each individual task to be performed and describes what each task is to accomplish.

7. Shall set forth the time of beginning and completion of work under the agreement.

8. Should include provisions for time extensions.

9. Should include provisions for the ownership of documents produced.

10. Shall set forth the terms under which the consultant may be compensated for extra work.

11. Should include provisions that apply in the event that the agreement is terminated or suspended.

12. Should include arbitration provisions for settling disputes regarding the agreement.

13. Shall include a clause stating that the Consultant shall defend, indemnify and save harmless the LPA, the Department, the FHWA, its agencies, agents, employees and assignees and the Federal Government from all claims and liabilities due to negligent acts, errors, or omissions of the Consultant, its members, agents, stockholders or employees in connection with performance of the agreement.

14. Shall include a clause stating that the Consultant shall not engage the services of any person or persons, in the employ of the LPA, Department, or FHWA for work covered by the agreement without the written consent of the employers of such persons.

15. Shall include a statement that the consultant agrees to comply with all Federal, State and Local laws and ordinances applicable to the work.

16. Shall include provisions prohibiting subletting, assigning or transferring any portion of the agreement without the LPA's approval.

17. Shall include provisions stating that the Consultant warrants that they have not employed or retained any company or person, other than a bona fide employee working for the Consultant, to solicit or secure the agreement and that they have not paid or agreed to pay any company or person, other than a bona fide employee, any fee, commission, percentage, brokerage fee, gift or any other consideration, contingent upon or resulting from the award or making of the agreement. For breach or violation of this warranty, the LPA shall have the right to annul the agreement without liability, or, in its discretion to deduct from the agreement price or consideration, or otherwise recover, the full amount of such fee, commission, percentage, brokerage fee, gift or counterpart fee.

18. Shall include provisions (when the scope of services calls for completing final letting plans) that require the signature of an Iowa licensed professional engineer or architect on the final plans.

19. Shall contain a section whereby the consultant, their assignees and successors in interest agree to comply with 23 U.S.C. 112(b) (2) and the following: In all programs and activities of Federal-aid recipients, subrecipients, and contractors, no person in the United States shall be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination on the grounds of race, color, creed, religion, sex, national origin, age, or handicap/disability. The LPA has determined a Disadvantaged Business Enterprise (DBE) goal of _____ percent for this agreement.

20. Shall include provisions that provide for access to the consultant's records and sets forth the time of record retention as three years from the date of final payment.

21. Shall include a clause stating that the consultant agrees to reimburse the Department for any overpayment determined by audit.

22. Shall contain a section covering fees and payment to the consultant. This section shall identify the method(s) of payment (lump sum, cost plus a fixed fee, cost per unit of work, or specific rate(s) of compensation). Federal reimbursement shall be limited to the Federal share of the costs allowable under the cost principles in 48 CFR part 31 (Federal Acquisition Regulations). Therefore, it is recommended that the agreement be structured in accordance with the cost principles of 48 CFR part 31.

23. Should include clauses that define what constitutes the entire agreement and how the validity of the agreement is effected if part(s) of the agreement is ruled invalid.

24. Shall include a page for signature by the contracting agency (LPA) and the consultant. This page shall also include one of the following signature blocks.

Iowa Department of Transportation Project Development Division Accepted for Authorization	OR	Iowa Department of Transportation Project Development Division Accepted for Authorization
_____ Urban Systems Engineer Date		_____ Secondary Roads Engineer Date

25. Shall include a detailed itemized cost estimate page that includes a summary of staff hours, fees, indirect costs and any subcontract costs. Any costs not eligible for Federal–aid participation should be clearly identified.

26. Shall include a clause when applicable that states that all subconsultants are bound by the same requirements as contained in the agreement between the LPA and the prime consultant.

27. Should include the following attachments:

"Certification Regarding Debarment, Suspension And Other Responsibility Matters"; and

"Certification Of Consultant" and "Certification of Owner" the purpose of which are to certify that no firm, organization or person was retained to secure the Agreement.

SAMPLE

CONSULTANT

AGREEMENT

TABLE OF CONTENTS

AGREEMENT FOR PROFESSIONAL SERVICES

This Agreement made and entered into this *Xnd* day of *MONTH, YEAR* by and between the *PROJECT OWNER* hereinafter referred to as the *"OWNER"* and *XYZ Consulting* , hereinafter referred to as the "Consultant":

WITNESSETH:

WHEREAS, the *OWNER* has decided to *BUILD PROJECT ABC* through the ____ of _____; and WHEREAS, it has been agreed that the *OWNER* shall proceed to the preparation of final design plans, specifications and estimates for *THE ABC PROJECT* subject to the concurrence and approval of the Iowa Department of Transportation, and THE *OWNER;* and WHEREAS, the said *OWNER* desires to employ *XYZ CONSULTING* to provide *PROFESSIONAL SERVICES* in connection with the design and preparation of plans, specifications and estimates for said *PROJECT*; and WHEREAS, the Consultant is willing to perform such *PROFESSIONAL SERVICES* in accordance with the terms of this agreement represents that it is in compliance with Iowa statutes relating to the registration of Professional *STAFF;* and WHEREAS, in accordance with Iowa Law (Chapter *XXX*, Code of Iowa *YEAR*), the *OWNER* is authorized to enter into such agreement;

NOW, THEREFORE: The parties, for the consideration specified below, mutually agree as follows:

I. DEFINITIONS

Wherever in this Agreement the following terms, or pronouns used in their stead occur, they shall have the meaning here given:

The "effective date" of this Agreement shall mean the date mentioned in the first paragraph of this document under the heading AGREEMENT FOR PROFESSIONAL SERVICES.

"Owner" shall mean the City/County of *XYZ.*

"*STATE*" shall mean the Project Development Division of the Iowa Department of Transportation, Ames, Iowa.

"Consultant" shall mean the firm of *Professional Services Provider.*

II. GENERAL

A. For the purpose of administration of the studies, investigations, designs and plans to be prepared under this Agreement, the *Consultant* has been designated by the *Owner* to receive all communications and information, to arrange such conferences as may be required, to secure and obtain all comments and approvals of the *Owner* and the *STATE* and to transmit such comments and approvals to the *Consultant.*

B. The work under this Agreement shall at all times be subject to the general supervision and direction of the *Consultant.*

C. From time to time as the work progresses, conferences will be held at mutually convenient locations at the request of the *Owner* to discuss details of the design and progress of the work. The *Consultant* shall prepare and present such information and studies as may be pertinent and necessary or as may be requested by the *Owner*, to enable the *Owner* to review and pass judgement on the features and progress of the work. The *Consultant* shall make such changes, amendments or revisions in the detail of the work as may be required by the *Owner.*

D. At the request of the *Owner*, the *Consultant* shall furnish sufficient prints of plans or other data in such detail as may be required, for the purposes of review of details.

E. The work under this Agreement shall be contingent upon and subject to the concurrence of the *STATE.* The *STATE* shall have the right to participate in the conferences between the *Consultant* and the *Owner* and to participate in the review or examination of the work in progress.

F. Compliance with all of the foregoing shall be considered to be within the purview of this Agreement and shall not constitute a basis for additional or extra compensation.

III. SCOPE OF SERVICES

The work to be performed by the *Consultant* under this Agreement shall encompass and include all detail work, services, materials, equipment, and supplies necessary to prepare and deliver contract plans and specifications for *the Project located within the City or County.* The work shall consist of the making of final designs, as-built plans, contract drawings, specifications and estimates for the award of a contract, or contracts, for the construction or installation of the design.

Contract Drawings, Specifications and Estimates:

Upon receipt of a written notice by the *Owner* the *Consultant* shall proceed with final design, contract drawings, specifications and estimates for the award of a contract or contracts for the construction or installation of the design. Upon receipt of such notice to proceed, the *Consultant* shall provide the *Owner* with:

1. Layout plans and appropriate detail design drawings which shall consist of all plans, elevations, and other drawings, necessary for letting purposes. All original tracings shall be prepared on sheets 22" x 34" or 11" X 17" in size and shall be pencil or ink on mylar or white bond paper. All work shall be in conformity with the standards of the Iowa Department of Transportation.

2. Complete specifications covering the work to be constructed.

3. Consultation during the course of design and attendance at conferences with the *Owner* and reviewing agencies.

4. Monthly progress reports shall indicate the percentage of work completed to the date of such report, together with a description of the status of work in progress. Such progress report shall be used as a basis for monthly statements for partial payments to the *Consultant.*

5. Prints of plans in process upon request to keep the *Owner* fully informed as to the progress of the work. Meetings to discuss progress will be held periodically as requested by the *Owner.*

Miscellaneous Provisions:

The following miscellaneous provisions shall apply to the work to be performed and the *Professional Services* to be furnished under this Agreement:

A. Right-Of-Way

Plats and descriptions for right-of-way conveyances will be prepared by, _____.

B. Obligation of *Owner* to *Consultant*

The *Owner* will provide the following:

To be determined by *Owner*

IV. TIME OF BEGINNING AND COMPLETION

The *Consultant* shall not begin work under this Agreement until so directed by the *Owner.* The *Consultant* shall, upon receipt of said direction, begin work. Contract plans and specifications shall be completed and submitted to the *Owner* within a specified time period after notification to begin work.

V. EXTENSION OF TIME

The time for completion of each phase of this Agreement shall not be extended because of any unwarranted or avoidable delay attributed to the *Consultant*, but may be extended by the *Owner* in the event of a delay attributed to the *Owner* or because of unavoidable delays caused by an act of God, war, governmental actions, or other conditions beyond the control of the *Consultant*. Delays grossly affecting the completion of work within the time specified for completion, attributable to or caused by the *Consultant*, shall be considered as cause for the termination of this Agreement by the *Owner*.

VI. OWNERSHIP OF DOCUMENTS

All sketches, tracings, plans, specifications, reports on special studies and other data prepared under this Agreement shall become the property of the *Consultant*. Copies of these materials shall be available to the *Owner* upon request prior to the termination of the services of the *Consultant*. The *Consultant* retains a license to use these materials in future projects or for professional promotion.

VII. REVISION OF COMPLETED PLANS

A. Review contract plans shall be submitted to the *Owner* for review and comment. The comments received from the *Owner* and the reviewing agencies shall be incorporated by the *Consultant* prior to submission of the final plans. Plans revised in accordance with the review comments shall be considered to constitute "satisfactorily completed and accepted plans". Comments on review plans and major approval shall be in writing.

B. In the event that plans are found to be in error during construction of the project and revision or reworking of the plans is necessary, the *Consultant* agrees that it shall do such revising without expense to the *Owner* even though final payment may have been received. The *Consultant* must give immediate attention to these changes so there will be a minimum of delay to the Contractor. The above and foregoing is not to be construed as a limitation of the *Owner's* right to seek recovery of damages for negligence on the part of the *Consultant*.

C. Should the *Owner* find it desirable to have previously satisfactorily completed and accepted plans or parts thereof revised, the *Consultant* shall make such revisions if requested and directed by the *Owner* in writing. This work will be paid for as provided in Section X.

VIII. EXTRA WORK

If the *Consultant* is of the opinion that any work it has been directed to perform is beyond the scope of this Agreement, and constitutes "Extra Work" it shall promptly notify the *Owner* in writing to that effect. In the event that the *Owner* determined that such work does constitute "Extra Work", the *Owner* shall provide extra compensation to the *Consultant* upon the basis of the schedule shown in Attachment " D" or upon the basis of actual costs plus a fixed fee amount, or a negotiated lump sum. Unless approval for "Extra Work" has been secured in advance from the *Owner*, no claims will be allowed

IX. TERMINATION OF AGREEMENT

A. In the event of the death of any member or partner of the Consultant's firm, the surviving members shall complete the work, unless otherwise mutually agreed upon by the *Owner* and the survivors

B. The right is reserved by the *Owner* to terminate this Agreement at any time upon not less than thirty (30) days written notice to the *Consultant*.

C. In the event the Agreement is terminated by the *Owner* without fault on the part of the *Consultant*, the *Consultant* shall be paid for work performed to the date of receipt of the termination notice. The value of the work performed and services rendered and delivered, and the amount to be paid shall be mutually satisfactory to the *Owner* and the *Consultant*. The *Consultant* shall be paid a portion of the fixed fee, plus actual costs. The portion of the fixed fee shall be based on the ratio of the actual costs incurred to the estimated actual costs contained in Section XXI. Actual costs to be reimbursed shall be determined by audit of such costs to the date established by the *Owner* in the termination notice except that actual costs to be reimbursed shall not exceed

the Estimated Actual Costs.

D. In the event the Agreement is terminated by the *Owner* for fault on the part of the *Consultant*, the *Consultant* shall be paid only for work satisfactorily performed up to the date of receipt of the termination notice. After audit of the Consultant's actual costs to the date of the termination notice and after determination by the *Owner* of the amount of work satisfactorily performed, the *Owner* shall determine the amount to be paid to the *Consultant*.

E. The right is reserved by the *Owner* to suspend this Agreement at any time. Such suspension may be effected by the *Owner* by giving the *Consultant* written notice and will be effective as of the date of receipt of the suspension notice. Payment for the Consultant's services will be made by the *Owner* to the date of such suspension, in accordance with paragraph C above.

F. Should the *Owner* wish to reinstate the work after notice of suspension, such reinstatement may be accomplished by thirty (30) days written notice within a period of one year after such suspension, unless this period is extended by written consent of the *Consultant*. If the Agreement has been terminated for six months or more, the fees provided for herein shall be renegotiated prior to reinstatement at the Consultants option.

G. Unless this Agreement has been terminated prior to the completion of the work as hereinbefore provided, this Agreement shall not be considered terminated upon completion and acceptance of the work, or upon final payment therefore, but shall be considered to be in full force and effect for the purpose of requiring the *Consultant* to make such revisions or corrections in the work as are necessary to correct errors made by the *Consultant* in the work or for the purpose of requiring the *Consultant* to make revisions in the work at the request of the *Owner* as "Extra Work". This Agreement will be considered terminated when the construction of the project has progressed sufficiently to make it manifest that the project can be completed without further revisions in the work, or if the *Consultant* is released prior to such time by written notice from the *Owner*.

X. ARBITRATION

Any dispute between the *Owner* and the *Consultant*, not otherwise resolved by the parties pursuant to the provisions of this contract, including the documents incorporated herein by reference, shall be settled by filing a proper action in the proper District Court of the State of Iowa, and subsequent arbitration as provided in Chapter 679A of the Code of Iowa. This Section is the only section of this contract relating to "arbitration" and Article 1109.13 of the most current version of the "Standard Specifications" is deleted from, and is not a part of this contract.

XI. RESPONSIBILITY FOR CLAIMS AND LIABILITY.

The *Consultant* shall save harmless the Iowa Department of Transportation, the State of Iowa, and the Federal Government, from all claims and liabilities due to design error, omission or negligence of its members, agents, or employees in connection with performance under this Agreement or for breach of this Agreement.

XII. NON-RAIDING CLAUSE

The Consultant shall not engage the services of any person or persons, in the employ of the *Owner* for work covered by this Agreement without the written consent of the employers of such persons.

XIII. GENERAL COMPLIANCE WITH LAWS

The *Consultant* shall comply with all Federal, State and Local laws and ordinances applicable to the work.

XIV. SUBLETTING, ASSIGNMENT OR TRANSFER

Subletting, assignment, or transfer of all or part of the interest of the *Consultant* in this Agreement is prohibited unless written consent is obtained from the *Owner* and approved by the Iowa Department of Transportation. The *Consultant* shall submit proposed contracts with subconsultants to the *Owner* to review and approve prior to their execution.

XV. FORBIDDING USE OF OUTSIDE AGENTS

The *Consultant* warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the *Consultant*, to solicit or secure this Agreement, and that it has not paid or agreed to pay any company or person other than bona fide employees working solely for the *Consultant*, any fee, commission, percentage, brokerage fee, gifts, or any other consideration contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, the *Owner* shall have the right to annul the Agreement without liability, or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such fee, commissioning percentage, brokerage fee, or counterpart fee.

XVI. CONSULTANT'S ENDORSEMENT ON PLANS

The *Consultant* shall endorse the completed plans and report prepared under this Agreement, and shall affix thereto the seal of a licensed professional, licensed to practice in the State of Iowa.

XVII. COMPLIANCE WITH TITLE 49, CODE OF FEDERAL REGULATIONS

During the performance of this contract, the *Consultant*, for itself, its' assignees and successors in interest (hereafter referred to as the "*Consultant*"), agrees as follows:

1. Compliance with regulations. The *Consultant* will comply with the regulations of the U.S. Department of Transportation, relative to nondiscrimination in federally assisted programs of the U S. Department of Transportation (Title 49, Code of Federal Regulations, Part 21, hereinafter referred to as the "Regulations"), which are herein incorporated by reference and made a part of this contract

2. Nondiscrimination. The *Consultant*, with regard to the work performed by it, will not discriminate on the grounds of race, color, sex, age, physical disability or national origin in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The *Consultant* will not participate, either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix "A","13", and "C" of the Regulations.

3. Solicitation for Subcontracts, Including Procurement of Materials and Equipment. In all solicitations, either by competitive bidding or negotiation made by the *Consultant* for work to be performed under a subcontract, including procurement of materials or equipment, each potential subcontractor or supplier shall be notified by the *Consultant* of the Consultant's obligation under this contract and the regulations relative to nondiscrimination on the grounds of race, color, sex, age, physical disability or national origin.

Disadvantaged Business Enterprises (DBE's).

The *Consultant* or its subcontractors agree(s) to ensure that disadvantaged business enterprises (DBE) as defined in 49 CFR, Part 23, subpart D and amendments 106(c) have the maximum opportunity to participate in the performance of contracts and subcontracts financed in whole or in part with Federal funds provided under this Agreement. In this regard the *Consultant* and all of its subcontractors shall take all necessary and reasonable steps in compliance with the Iowa Department of Transportation DBE Program to ensure minority and women business enterprises have the opportunity to compete for and perform contracts.

1. The *Consultant* and their subconsultants shall not discriminate on the basis of race, color, religion, national origin, sex, age or physical disability in the award and performance of U.S. Department Of Transportation assisted contracts. If, as a condition of assistance, the Iowa Department of Transportation has submitted to the U.S. Department Of Transportation , or the *Consultant* has submitted to the Iowa Department of Transportation and the U.S. Department Of Transportation has approved a minority and women business enterprise affirmative action program which the Iowa Department of Transportation and/or *Consultant*

agree(s) to carry out, this program(s) is incorporated into this agreement by reference (refer to Attachment "A"). This program shall be treated as a legal obligation and failure to carry out its terms shall be treated as a violation of this financial assistance agreement. Upon notification to the *Consultant* of its failure to carry out the approved program the *Owner* and/or the Iowa Department of Transportation shall impose sanctions which may include termination of the Agreement or other measures that may affect the ability of the *Consultant* to obtain future U.S. Department Of Transportation financial assistance.

2. The *Consultant* or any of its subconsultants are hereby advised that failure to fully comply with the Iowa Department of Transportation's DBE Program shall constitute a breach of contract and may result in termination of this Agreement or contract(s) by the *Owner* or such remedy as the *Owner* deems appropriate. Refer to Section X of the Agreement.

E. Information and Reports.

The *Consultant* will provide all information and reports required by the regulations, orders and instructions issued pursuant thereto, and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the *STATE* or the Federal Highway Administration, to be pertinent to ascertain compliance with regulations, orders and instructions. Where any information required of a *Consultant* is in the exclusive possession of another who fails or refuses to furnish this information the *Consultant* shall so certify to the *Owner*, or the *STATE* as appropriate, and shall set forth what efforts it has made to obtain information.

F. Sanctions for Noncompliance.

In the event of the *Consultant's* noncompliance with the nondiscrimination provisions of this contract, the *Owner* shall impose such contract sanctions as it, or the *STATE* may determine to be appropriate, including, but not limited to:

1. Withholding of payments to the *Consultant* under the contract until the *Consultant* complies, and/or

2. Cancellation, termination or suspension of the contract, in whole or in part

G. Incorporation of Provisions.

The *Consultant* will include the provisions of Paragraphs (A) through (F) in every subcontract, including procurement of materials and leases of equipment, unless exempt by the regulations, orders or instructions issued pursuant thereto. The *Consultant* will take such action with respect to any subcontract or procurement as the *Owner* or *STATE* may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided, however, that in the event a *Consultant* becomes involved in, or is threatened with litigation with a subcontractor or supplier as a result of such direction, the *Consultant* may request the *STATE* to enter into such litigation to protect the interests of the *STATE* and, in addition, the *Consultant* may request the United States to enter into such litigation to protect the interests of the United States

XVIII. ACCESS TO RECORDS

A. The *Consultant* and its subcontractors are to maintain all books, documents, papers, accounting records and other evidence pertaining to costs incurred and to make such materials available at their respective offices at all reasonable times during the contract period, and for three years from the date of final payment under the contract, for inspection and audit by the *STATE*, Federal Highway Administration, or any authorized representatives of the Federal Government; and copies thereof shall be furnished, if requested.

B. The Consultant's records used to develop the proposed fees for performing work covered by this Agreement shall also be available for review by authorized representatives of the *STATE*, or Federal Highway Administration for a period of three years from the date of final payment under the contract.

XIX. FEES AND PAYMENTS

A. For full and complete compensation for all work, materials, and services furnished under the terms of this Agreement, the *Consultant* shall be paid fees in the amounts of the Consultant's actual cost plus applicable fixed fee amounts. Consultants actual costs shall include payments to any subconsultants. The estimated costs and fixed fee are shown below and are itemized in Attachment D.

The nature of professional services is such that actual costs are not completely determinate. Therefore, it is possible that the Consultant's actual costs may exceed those shown in Attachment D and as shown below. A contingency amount has been established to provide for actual costs which exceed those estimated.

Estimated Actual Costs

Fixed Fee

Contingency

Amount Payable

If at any time during the work the *Consultant* determines that its actual costs will exceed the estimated actual costs, thus necessitating the use of the contingency amount, it will promptly notify the *Owner* in writing and describe what cost are causing the overrun and the reason. The *Consultant* shall not exceed the estimated actual costs without the prior written approval of the *Owner*. The *STATE* may audit the Consultants cost records prior to authorizing the use of the contingency amount.

The *Consultant* shall require any subconsultants to notify him if at any time they determine that their costs will exceed their estimated actual costs without prior written approval of the *Owner*.

The *Consultant* shall establish a procedure for comparing the actual costs incurred during the performance of the work to the estimated actual costs listed above. The purpose is to monitor these two elements and thus provide for early identification of any potential for the actual costs exceeding the estimated actual costs.

The prime *Consultant* is cautioned that cost overruns associated with any subconsultant's contract are not available for use by the prime contractor unless formal approval has been given.

If the *Consultant*, or his subconsultant(s), exceeds the estimated actual costs for any reason (other than that covered in paragraph B.3) before the *Owner* is notified in writing, the *Owner* will have the right, at its discretion, to deny the use of the contingency amount.

The fixed fee amounts will not be changed unless there is a substantial change in scope, character, or complexity of the services from those covered by this agreement or the time schedule is changed by the *Owner*. Any change in the fixed fee amount will be made by supplemental agreement.

The maximum amount payable under this contract is _____, which is the sum of the above amounts. The maximum amount payable can be increased by Supplemental Agreement if the *Consultant* establishes and the *Owner* agrees that the original estimates of anticipated manhours were inaccurate or that there is a justifiable change in the salary rates, payroll additives, overhead rates, or other supported costs from what was estimated. If at any time it is determined that a maximum amount payable has been or will be exceeded, the *Consultant* will notify the *Owner* in writing. The maximum amount payable will be increased by a Supplemental Agreement or this Agreement will be terminated, with the *Owner* having the right, at its discretion, to terminate this contract without payment of the amount exceeding the maximum amount payable. The *Consultant* shall submit proposed contracts with subconsultants to the *Owner* to review and approve prior to their execution.

B. Reimbursable Costs

Reimbursable costs are the actual costs incurred by the *Consultant* which are attributable to the specific work covered by this agreement and allowable under the provisions of Title 48, Subchapter E, Parts 31.105 and 31.2 of the current Federal Acquisition Regulations.

These include the following:

Salaries of the employees for time chargeable to work covered by the Agreement, and salaries of principles for the time they are productively engaged in work necessary to fulfill the terms of the agreement.

C. Payments. Monthly payments shall be made based on the percentage of work completed and substantiated by monthly progress reports. The report shall indicate the hours and reimbursable expenses associated with the work completed during the month. Such progress reports will be checked by the *Owner* and payment will be made during said month. The retention amount shall not exceed 5% of the maximum amount payable. The portion of the lump sum fee to be paid will be in the proportion of the actual work completed documented on the monthly progress reports. Upon completion, delivery and acceptance of all work contemplated under this Agreement, the *Consultant* shall submit only one final and complete invoice statement of costs incurred and/or amounts earned. At such time payment of 100% of the lump sum fee and reimbursable expenses shall be paid. The *Consultant* agrees to reimburse the *Owner* for possible overpayment determined by audit.

XX. ENTIRE AGREEMENT

This Agreement expresses the entire concurrence of the parties and no representations, promises or warranties have been made by either of the parties that are not fully expressed herein.

IN WITNESS WHEREOF, the parties' duly authorized officials have executed this Agreement as of the dates indicated below.

ATTEST:

By:
Date:

ATTEST:

Date

IOWA DEPARTMENT OF TRANSPORTATION
Project Development Division
Accepted for Authorization

By:		By:
Date:		Date:
Urban Systems Engineer	OR	Secondary Roads Engineer
State of Iowa		State of Iowa

ATTACHMENT A

CERTIFICATION OF *Consultant*

I hereby certify that I am a partner and duly authorized representative of the firm of *Consultant* whose address is *NNN Main Street, Anytown , Iowa 55555,* and that neither I nor the above firm I herein represent has:

(a) employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any firm or person (other than a bona fide employee working solely for me or the above *Consultant*) to solicit or secure this contract,

(b) agreed, as an express or implied condition for obtaining this contract, to employ or retain the services of any firm or person in connection with carrying out the contract, or

(c) paid, or agreed to pay, to any firm, organization or person (other than a bona fide employee working solely for me or the above *Consultant*) any fee, contribution, donation or consideration of any kind for, or in connection with, procuring or carrying out the contract; except as here expressly stated (if any):

I acknowledge that this certificate is to be furnished to the Iowa Department of Transportation and the Federal Highway Administration, U.S. Department of Transportation, in connection with this contract involving participation of Federal-aid Highway funds, and is subject to applicable State and Federal laws, both criminal and civil.

_____
(Date)

_____
(Signature)

ATTACHMENT B

CERTIFICATION OF OWNER

I hereby certify that I am the *Owner* and that the above consulting firm or its representative have not been required, directly or indirectly as an express or implied condition in connection with obtaining or carrying out this Agreement to:

(a) employ or retain, or agree to employ or retain, any firm or person, or

(b) pay, or agree to pay, to any firm, person, or organization, any fee contribution, donation or consideration of any kind: except as here expressly stated (if any):

I acknowledge that this certificate is to be furnished to the Iowa Department Of Transportation and to the Federal Highway Administration, in connection with this Agreement involving participation of federal-aid highway funds and is subject to applicable State and federal laws, both criminal and civil.

_____

Date

_____

Signature

ATTACHMENT C

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS -- PRIMARY COVERED TRANSACTIONS

Instructions For Certification

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.

3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

4. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

5. The terms "covered transaction," "debarred," "suspended," "Ineligible,~ "lower tier covered transaction," "participant," "person", "primary covered transaction," principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules Implementing Executive Order 12549. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

6. The prospective primary participant agrees by submitting this proposal that should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

7. The prospective primary participant further agrees by submitting this proposal that it will include the clause title "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals Each participant may, but is not required to, check the Nonprocurement List.

9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

10. Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default

i. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (I)(b) of this certification; and

d. have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, *Owner* or local) terminated for cause or default.

ii. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

ATTEST :
State of Iowa

_____ County

I, *JOHN A.SMITH* partner of *XYZ CONSULTING* being duly sworn (or under penalty of perjury under the laws of the United States, *STATE* of Iowa) do hereby certify that the above statements are true and correct.

_____
(Signature)

Subscribed and sworn to this day of _____

ATTACHMENT D

EXTRA WORK RATES SCHEDULE

Classification	Billing Rate per hour
I/II	
III	
Drafter	
W.P. 1	
W.P. 2	
Materials	
Travel	
Accommodations and Subsistence	
Subcontractors	

REPLACEMENT OF XIX FOR LUMP SUM

XIX. FEES AND PAYMENTS

A. For full and complete compensation for all work, materials, and services furnished under the terms of this Agreement, the Consultant shall be paid a lump sum for professional services of _____ plus actual costs of reimbursable expenses as defined in Section XIX B of this contract.

1. The lump sum fee amounts will not be changed unless there is a substantial change in scope, character, or complexity of the services from those covered by this Agreement or the time schedule is changed by the *OWNER*. Any change in the lump sum fee amount will be made by a Supplemental Agreement.

2. The maximum amount payable under this contract is _____ plus reimbursable expenses. The maximum amounts payable can be increased, by Supplemental Agreement, if the Consultant establishes and the *OWNER* agrees that the original estimates of engineering costs were inaccurate or that there is a justifiable change in the scope of services or other supported costs that were unforeseeable at the time of this agreement. If at any time it is determined that a maximum amount payable will be or has been exceeded, the Consultant shall immediately so notify the *OWNER* in writing. The maximum amount payable will be increased by a Supplemental Agreement or this Agreement will be terminated, with the *OWNER* having the right, at its discretion, to terminate this contract without payment of the amount exceeding the maximum amount payable. The *OWNER* or the State may audit the Consultant's cost records prior to making a decision whether or not to increase the maximum amount payable.

B. Reimbursable Expenses. Reimbursable costs are the actual costs incurred by the Consultant which are attributable to the specific work covered by this agreement and allowable under the provisions of Title 48, Subchapter E, Parts 31.105 and 31.2 of the current Federal Acquisition Regulations.

Include the following:

Direct out-of-pocket expenses incurred in fulfilling the terms of this Agreement. The Consultant will be required to submit a detailed listing of costs incurred. These costs may include travel and subsistence, outside reproductions, outside computer charges and materials and supplies.

C. Payments. Monthly payments shall be made based on the percentage of work completed and substantiated by monthly progress reports. The report shall indicate the hours and reimbursable expenses associated with the work completed during the month. Such progress reports will be checked by the *OWNER* and payment will be made during said month. The retention amount shall not exceed 5% of the maximum amount payable. The portion of the lump sum fee to be paid will be in the proportion of the actual work completed documented on the monthly progress reports. Upon completion, delivery and acceptance of all work contemplated under this Agreement, the Consultant shall submit only one final and complete invoice statement of costs incurred and/or amounts earned. At such time payment of 100 % of the lump sum fee and reimbursable expenses shall be paid. The Consultant agrees to reimburse the *OWNER* for possible overpayment determined by audit.

2 IN-HOUSE ENGINEERING PROCESS

November 1997

In-House Engineering Process

Costs of engineering services performed by the local public agency's (city, county) staff may be eligible for Federal participation. This federal participation is subject to appropriate authorization requirements and only to the extent that such costs are directly attributable and properly allocated to specific projects.

Federal funds may participate in the cost of salaries, wages, and related payroll expenses, but, only those incurred for periods of time public employees are actively engaged in project-related activities. These activities include:

(a) Preliminary engineering. Location, design, and related work preparatory to the advancement of a project to physical construction. Involves making surveys and preparing plans, specifications and estimates.

(b) Construction engineering. The supervision and inspection of construction activities; additional staking functions considered necessary for effective control of the construction operations; testing materials incorporated into construction; checking shop drawings; and measurements needed for the preparation of pay estimates. The percentage shall not exceed 15% of the construction costs.

(c) Right of Way Acquisition Services. The preparation of right-of-way plats; appraisals for parcel acquisitions; review of appraisals; preparation for and trial of condemnation cases; furnishing of relocation advisory assistance; and other related labor expenses.

Related payroll costs are identified as travel, transportation, leave, holidays, social security, retirement, and other payroll benefits.

The outlined steps are to provide assistance on the procedures which will need to be followed (see attached).

STEPS TO UTILIZE FEDERAL-AID FOR STAFF (IN-HOUSE) ENGINEERING

BOLD TYPE = LOCAL PUBLIC AGENCY (LPA) RESPONSIBILITIES

ITALICIZED TYPE = OTHER'S RESPONSIBILITIES

1. **Local Public Agency (LPA) writes Transportation Center Local Systems Engineer (TC) requesting federal-aid for "in-house" (with their own staff) engineering. This could be for preliminary (design) engineering, construction (inspection) engineering, or both. The request should include:**

   (1). Staff time (hours) for different phases of the work (survey, design, inspection, etc.). Staff time would be based on individual employees or classification of employees.

   (2). Wage rate per employee or class of employee. Explanation on how the LPA came up with wage rates including any payroll additives (i.e.; IPERS, FICA, benefits, etc.)

   (3). Equipment usage and costs. Examples: estimated CADD hours (and rate based on what?); vehicle miles (and rate); outside printing costs; etc.

2. *TC reviews estimate of hours for work and completeness of submittal. TC comments on estimate and if complete forwards to Local Systems (LS).*

3. *LS may request a pre-audit from the Office of Finance (External Audits), especially if the estimate is over $50,000.*

4. *External Audits performs pre-audit (if requested) and gives report to LS with a copy to Office of Finance (federal aid).*

5. *LS sends pre-audit report (if completed) to the TC and TC sends a copy to the LPA.*

   If the pre-audit report requires modifications of the LPA's submittal, the LPA must respond to External Audit's recommendations. TC will work with the LPA and External Audits until acceptable.

   If the pre-audit report doesn't require any modification, TC will inform the LPA that a request for authorization will be sent to the Federal Highway Administration (FHWA).

6. *LS requests Contracts to do an FHWA authorization.*

7. *After FHWA authorization LS notifies the LPA of effective date (notice to proceed). LS sends FHWA Authorization, PR-2 or PR-2A obligation forms to the LPA, Finance, TC, Planning Services, and MPO/RPA.*

8. *TC processes the billings received from the LPA for reimbursement.*

9. *Upon completion TC requests final audit from External Audits. External Audits may wave final audit on in-house engineering less than $50,000.*

10. *TC distributes final audit report (if completed) to LPA.*

11. *Finance sends copies of prepared final voucher(PR-20, FHWA 1447) to TC (3), Planning Services (1), and LS (1). TC distributes to the LPA and MPO/RPA.*

3 FORCE ACCOUNT CONSTRUCTION PROCESS

November 1997

Force Account Construction Process

Congress has provided that the contract method based on competitive bidding shall be used by local agencies (cities, counties) on Federal-aid projects. That is unless the local agency and state can demonstrate, to the satisfaction of the Federal Highway Administration (FHWA), that it is more cost effective to use some other method such as force account.

The term "force account" shall mean the direct performance of construction work by a local agency, railroad, or a public utility company. They must use labor, equipment, materials, and supplies furnished by them and used under their direct control.

The term "cost effective" shall mean the efficient use of labor, equipment, materials, and supplies to assure the lowest overall cost.

If a local agency (in order to perform force account work) must acquire or rent substantially more equipment than required for its normal operation, it may be difficult to justify the use of force account.

In order to possibly obtain FHWA authorization of force account work the following steps must be taken (see attached).

STEPS TO UTILIZE FEDERAL-AID IN FORCE ACCOUNT WORK

BOLD TYPE = LOCAL PUBLIC AGENCY (LPA) RESPONSIBILITIES
ITALICIZED TYPE = OTHER'S RESPONSIBILITIES

1. **Local Public Agency (LPA) writes Transportation Center Local Systems Engineer (TC) requesting federal-aid in force account work. Written request must include:**

   a. **Identification of project in the Statewide Transportation Improvement Program (STIP) and a description of the project and the kind of work to be performed by force account.**

   b. **The estimated costs including:**
      (1). **Staff time (hours) per different phases of the work and based on individual employees or classifications of employees.**

      (2). **Wage rate per employee or class including any payroll additives (IPERS, FICA, benefits, etc.).**

      (3). **Equipment type, usage (hours) and costs (cost or rental rate per hour or per mile).**

      (4). **Materials and supplies to be incorporated in the project and their costs. Include sources and suppliers, if known.**

      (5). **Federal funds to be requested.**

      (6). **Engineer's cost estimate of work if it was contracted by competitive bidding and what the estimate was based on.**

   c. **The reason or reasons that force account for the project is considered cost effective or is in the publics best interest.**

2. *TC reviews completeness of submittal including estimate of hours, materials, and equipment. TC reviews the LPA's reasons to use force account and its cost effectiveness proposal. If the LPA's submittal lacks completeness or would not receive a favorable recommendation from the TC, the TC will work with the LPA on the submittal. When the LPA request is acceptable to TC, TC forwards to Local Systems (LS) with recommendation.*

3. *LS may request pre-audit from the Office of External Audits, especially if the estimate is over $50,000.*

4. *Office of External Audits performs pre-audit and gives the report to LS with a copy to the Office of Finance (federal aid).*

5. *LS sends pre-audit report to the TC and TC sends a copy to the LPA.*

   If the pre-audit report requires modifications of the LPA's submittal, the LPA must respond to External Audits' recommendations. TC will work with the LPA and External Audits until acceptable.

   If the pre-audit report doesn't require any modifications, TC will inform the LPA that a request for approval to do force account and authorization to proceed will be processed.

6. *FHWA reviews requests which are over $100,000 and approves or disapproves the force account request and notifies LS. Under $100,000 will be approved or disapproved by LS.*

7. *If disapproved, LS provides the local agency and TC with reason(s).*

   If approved, LS notifies the LPA of effective date of the FHWA authorization to proceed. LS sends FHWA Authorization, PR-2 or PR-2A obligation forms to the, LPA, Finance, TC, Planning Services and MPO/RPA.

8. *TC processes the billings received from the LPA for reimbursement.*

9. *Upon completion TC request final audit from Office of External Audits. External Audits may wave final audit on force account projects less than $50,000.*

10. *TC Distributes final audit report if completed, to the LPA.*

11. *Finance sends copies of prepared PR-20 to TC (3), Planning Services (1), and LS (1). TC distributes to the LPA and MPO/RPA.*

4 IN-KIND CONTRIBUTION PROCESS

November 1997

In-Kind Contributions Process

The United States Code (23 USC 323) allows federal-aid applicants (State and Local Public Agencies (LPA)) to match the federal share on federal-aid projects with cash donations and in-kind contributions from third party (private) sources. In addition, the Federal Highway Administration (through an innovative financing program TE-045) permits the use of public agency in-kind contributions or funds from other federal agencies on projects developed under the Transportation Enhancement Program.

The term "in-kind contribution" refers to donated right-of-way, labor, materials, and equipment at current fair market rates. The sponsoring LPA would provide documentation to establish the fair market rate. Eligible donations must comply with applicable federal regulations. Physical construction performed with donated services/materials must comply with approved project design and satisfy the project's environmental conditions.

To process the in-kind contributions for approval and authorization, the following steps must be taken (see attached):

STEPS TO UTILIZE FEDERAL-AID FOR IN-KIND CONTRIBUTIONS

BOLD TYPE = LOCAL PUBLIC AGENCY RESPONSIBILITIES
ITALICIZED TYPE = OTHER'S RESPONSIBILITIES

1. **Local Public Agency (LPA) writes Transportation Center Local Systems Engineer (TC) requesting in-kind contribution to match Federal-aid. This request for in-kind contribution should be submitted with the concept statement. The written request must include:**

   a. **Identify the enhancement project in the Statewide Transportation Improvement Program (STIP), with a description of the project and of the donated items to be used for an in-kind contribution.**

   b. **If bid items can portray the in-kind contribution, the bid items shall correspond with the bid items in the English and Metric Bid Item Descriptions published by the office of Contracts.**

   c. **If labor, materials, and equipment portray the in-kind contribution, the LPA must include the following information:**

      (1) **For donated labor, the LPA shall provide the total number of hours estimated for each job classification. Also, provide wage rates for each job classification, including employee benefits. The documentation of the wage rates should reflect the "typical" wage rates of the LPA's community.**

      (2) **For donated materials, the LPA shall provide a detailed description. This would include an estimate of the total number of items donated. For each item in the materials list, the LPA shall provide a unit cost. (Current invoices and price sheets are a good source of documentation for this category.)**

      (3) **For donated equipment, the LPA shall provide an estimate of the total number of hours and hourly rates for each type and size of equipment used on the project. (The FEMA or Blue Book equipment rates are a good source of information for this category.)**

   d. **If Right Of Way (ROW) portrays the in-kind contribution, the LPA must submit an appraisal for the value of the property. The appraisal should conform to the Iowa DOT Appraisal Manual.**

   e. **Document the amount of Federal funds to be matched by the in-kind contribution. (For contract work, an engineer's estimate would be a good source of information.)**

2. *TC reviews completeness of submittal including the estimate of hours, materials, and equipment. If the LPA's submittal lacks completeness, the TC will work with the LPA on the submittal. When the LPA's request is acceptable to the TC, TC will forward the submittal to the office of Local Systems (LS).*

3. *After the LS receives the submittal for the in-kind contribution from the TC, the LS may request a pre-audit from the office of Finance (External Audits).*

   a. *If requested, External Audits will perform the pre-audit and send the Pre-Audit Report of Evaluation and Assurance to the LS.*

      LS sends the Pre-Audit Report of Evaluation and Assurance to the TC and the TC sends a copy to the LPA.

      If the Pre-Audit Report of Evaluation and Assurance requires modifications of the LPA's submittal, the LPA must respond to the External Audits' recommendations. TC will work with the LPA and External Audits until the pre-audit is acceptable.

      If the Pre-Audit Report of Evaluation and Assurance does not require any modifications, TC will send the LPA a copy.

   b. *If no pre-audit is requested, LS will respond to the TC with comments on the submittal.*

4. *After the LS receives the finalized submittal for the in-kind contribution from the TC, the LS will review the submittal for completeness.*

   If the submittal is incomplete, the LS will contact the TC and report on the areas that are not complete. The TC will work with the LPA to obtain the needed material.

5. *If on NHS route, LS will write a memorandum to the FHWA for approval of the in-kind contributions, otherwise LS approves.*

6. *When approved, LS will send a copy of the approval to the TC and the office of Finance (Federal Aid). The amount of funds approved for in-kind contributions shall be the maximum value to be used as matching funds.*

7. *LS will write a memorandum to the office of Contracts to obtain FHWA authorization according to the type of project and corresponding procedures.*

8. *After the FHWA authorizes the enhancement project, the LS will send a copy of the authorization to the LPA, TC, Federal Aid, office of Planning Services, and MPO/RPA.*

9. *TC will reimburse the billings from the LPA and verify the in-kind contribution was accomplished.*

10. *Upon completion of the enhancement project, the TC may request a final audit or review from the office of Finance, External Audits.*

11. *TC sends a copy of the Certification of Audit to the LPA, if completed.*

12. *Office of Finance sends copies of prepared final voucher to TC (3), office of Planning Services (1), LS (1). TC distributes to the LPA and MPO/RPA.*

5 DESIGN CRITERIA FOR FEDERAL-AID PROJECTS

Form 000021-WP
2-75

IOWA DEPARTMENT OF TRANSPORTATION

To Office: Project Development
Information Packet Recipients

Date: October 15, 1997

From: Local Systems

Subject: Design Criteria for Federal-Aid Road and Bridge Projects

Attached are copies of the Urban Design Tables for use on city street and bridge projects and County Engineers I.M.s 3.210 and 3.214 for use on county road and bridge projects using federal funds. We have also added the Interim Metric Design Tables for your use. Please note that we currently expect that projects let with federal funds after October 1, 1999 should be metric designs.

The tables should be used in the same manner as in the past. The Design Aids tables are to be used to determine the initial design parameters for new construction or reconstruction projects. If your project will not meet or exceed the values in the Design Aids tables, you must review your reasons with the Transportation Center Local Systems Engineer.

The Alternative Urban Design Guides for city projects and the AASHTO Guidelines tables for county projects provide acceptable AASHTO values where the Design Aids values are not appropriate. Any project that cannot meet the Alternative Urban Design Guides and/or AASHTO Guidelines must be justified to the Iowa DOT. This justification must be according to the Design Exception Process shown on Supplemental Flow Chart 2P and the Design Exception Process outlined in this packet. County Engineers' I.M. 3.216 outlining economic analysis procedures and County Engineers' I.M. 3.218 outlining design exception procedures are included to assist with the Design Exception Process

The Urban 3R Guidelines table for city projects and I.M. 3.214 for county projects provide acceptable design criteria for rehabilitation, restoration and resurfacing projects. Design elements which do not meet these "3R" guidelines must also be justified to the Iowa DOT according to the Design Exception Process. .

Be sure you read the notes that apply to each table. Contact your Transportation Center Local Systems Engineer if you have any questions.

LHB
Attachments

October 1992

URBAN DESIGN AIDS

These aids are presented to help in the design of new or completely reconstructed nonprimary city streets when federal-aid funds are utilized. Each design element of each project should reflect the most practicable and economically justified value. Proposed design criteria between this table and the "Alternative Urban Design Guides" Table need to be reviewed with the Iowa DOT.

(1) TYPE FACILITY	ARTERIAL					COLLECTOR					LOCAL				
TYPE AREA	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL
(2) Traffic Lanes (number)	4	2	4	2	2	4	2	4	2	2	4	2	4	2	2
(3) Design Speed (mph)	40	40	50	40	55	40	40	40	40	50	30	30	30	30	45
Stopping Sight Distance (ft.)	275–325	275–325	400–475	275–325	450–550	275–325	275–325	275–325	275–325	400–475	200	200	200	200	325–400
(4) Max. Curvature (degrees)	10	10	6	10	6	10	10	10	10	7.5	19	19	19	19	9.5
(5) Max. Gradient (percent)	5	5	7	8	5	5	5	9	9	6	5	5	9	11	7
Travel Lane Width (ft.)	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11
(6) Parking Lane Width (ft.)	12	12	11	11	--	10	10	10	10	--	10	10	9	9	--
(7) Curb & Gutter Width (ft.)	2.5	3.5	2.5	3.5	--	2.5	3.5	2.5	2.5	--	2.5	2.5	2.5	2.5	--
Shoulder Width (ft.)	--	--	--	--	8	--	--	--	--	8	--	--	--	--	6
Median Widths (ft.)															
Raised Curb	6	--	6	--	--	4	--	4	--	--	4	--	4	--	--
With Left Turn	18	--	18	--	--	16	--	16	--	--	14	--	14	--	--
(8) Border Area Width (ft.)	12	12	12	12	--	11	11	11	11	--	10	10	10	10	--
Vertical Clearance (ft.)	16.5	16.5	16.5	16.5	16.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
(9) Horizontal Clearance (ft.)	10	10	10	10	RDG	10	10	10	10	RDG	10	10	10	10	10
(10) Bridge Width, New (ft.)	56	32	56	32	40	56	32	56	32	40	54	30	50	28	30
(11) Bridge Width, Existing (ft.)	52	30	52	30	24	52	30	52	28	24	52	28	48	26	24

NOTES:

(1) According to existing Federal Functional Classification.
(2) Actual number of lanes based on highway capacity--more than four lanes refer to AASHTO "Policy" (Greenbook).
(3) Design Speed should be posted speed plus 5 mph, if practicable.
(4) Urban areas based on e = 0.04 and rural on e = 0.08.
(5) Maximum Gradient may be steepened by 2 percent for short distances (< 500') and on one-way down grades.
(6) Gutter width may be included as part of the parking lane width.
(7) Curbs should be mountable when the posted speed is 45 mph or more, if practicable.
(8) Border area is the area between the roadway and the right-of-way line. Usually includes sidewalk at least 4' in width.
(9) RDG = Roadside Design Guide. Horizontal clearance measured from the back of curb; from travel lane on rural section.
(10) Bridge width should be, at least, equal to traveled way plus 4' both sides. Width doesn't allow for parking or sidewalks. One sidewalk should be extended across structure. Guardrail should be installed when posted speed is over 35 mph. Design Loading should be HS-20.
(11) Bridge width should be, at least, equal to curb to curb width and design loading should be, at least, HS-15; except local may be H-15. Guardrail and bridge rails which are structurally deficient and functionally obsolete should be reviewed for possible upgrading.

October 1992

ALTERNATIVE URBAN DESIGN GUIDES

These guides are presented as alternative design criteria for new or completely reconstructed nonprimary city streets when federal aid funds are utilized. Design exceptions below the values shown in this table will be considered on a project by project basis, provided that each exception is justified to the Iowa DOT.

(1) TYPE FACILITY	ARTERIAL					COLLECTOR					LOCAL				
TYPE AREA	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL
(2) Traffic Lanes (number)	4	2	4	2	2	4	2	4	2	2	4	2	4	2	2
(3) Design Speed (mph)	30	30	40	30	45	30	30	30	30	40	20	20	20	20	30
Stopping Sight Distance (ft.)	200	200	275–325	200	325–400	200	200	200	200	275–325	125	125	125	125	200
(4) Max. Curvature (degrees)	19	19	10	19	9.5	19	19	19	19	12.25	45	45	45	45	22.75
(5) Max. Gradient (percent)	8	8	8	9	7	8	8	10	11	8	8	8	11	12	10
Travel Lane Width (ft.)	11	11	11	11	11	11	11	10	10	11	11	11	10	10	10
(6) Parking Lane Width (ft.)	10	10	8	8	--	8	8	7	7	--	8	8	7	7	--
(7) Curb & Gutter Width (ft.)	1.5	1.5	1.5	1.5	--	1.5	1.5	1.5	1.5	--	1.5	1.5	1.5	1.5	--
Shoulder Width (ft.)	--	--	--	--	8	--	--	--	--	6	--	--	--	--	4
Median Widths (ft.)															
Raised Curb	4	--	4	--	--	2	--	2	--	--	2	--	2	--	--
With Left Turn	14	--	14	--	--	12	--	12	--	--	11	--	11	--	--
(8) Border Area Width (ft.)	8	8	8	8	--	8	8	8	8	--	5	5	5	5	--
Vertical Clearance (ft.)	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
(9) Horizontal Clearance (ft.)	3	3	3	3	10	2	2	2	2	10	1.5	1.5	1.5	1.5	10
(10) Bridge Width, New (ft.)	46	24	46	24	28	46	24	46	24	28	46	24	42	22	26
(11) Bridge Width, Existing (ft.)	44	22	44	22	22	44	22	40	20	22	44	22	40	20	20

NOTES:

(1) According to existing Federal Functional Classification.

(2) Actual number of lanes based on highway capacity--more than four lanes refer to AASHTO "Policy" (Greenbook).

(3) Design Speed should be equal to or greater than posted speed.

(4) Urban areas based on e = 0.04 and rural on e = 0.08. With design speeds of 30 mph of less, conditions may warrant elimination of superelevation.

(5) Maximum Gradient may be steepened by 2 percent for short distances (< 500') and on one-way down grades.

(6) Gutter width may be included as part of the parking lane width.

(7) Curbs should be mountable when the posted speed is 50 mph or more.

(8) Border area is the area between the roadway and the right-of-way line. Usually includes sidewalk at least 4' in width.

(9) Horizontal clearance measured from the back of curb; from travel lane on rural section. Fixed objects (utility poles, traffic signal supports, etc.) which are to be newly installed or physically relocated because of the project, should be placed at the right-of-way line or at a clearance of ten feet.

(10) Bridge width should be, at least, equal to curb to curb width. Width doesn't allow for parking or sidewalks. One sidewalk should be extended across structure. Guardrail should be installed when posted speed is over 35 mph. Design Loading should be HS-20.

(11) Bridge width should be, at least, equal to width of travel way and design loading should be, at least, HS-15; except local may be H-15. Guardrail and bridge rails which are structurally deficient and functionally obsolete should be reviewed for possible upgrading.

October 1992

URBAN 3R GUIDELINES

This table contains acceptable values for 3R federal–aid projects on nonprimary city streets. Each project is to be considered individually to determine what improvements are feasible to extend the useful life of the existing streets and enhance safety. Values below these will be considered on a project by project basis provided that each exception is justified to the Iowa DOT.

(1) TYPE FACILITY	ARTERIAL					COLLECTOR				
TYPE AREA	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL
Traffic Lanes (number)	4	2	4	2	2	4	2	4	2	2
(2) Design Speed (mph)	EXISTING					EXISTING				
(3) Stopping Sight Distance (ft.)	BASED ON DESIGN SPEED					BASED ON DESIGN SPEED				
(4) Max. Curvature (degrees)	BASED ON DESIGN SPEED					BASED ON DESIGN SPEED				
Max. Gradient (percent)	EXISTING					EXISTING				
Travel Lane Width (ft.)	11	11	10	10	11	11	11	10	10	11
(5) Parking Lane Width (ft.)	9	9	8	8	--	8	8	7	7	--
Curb Width (ft.)	.5.	.5	.5	.5	--	.5	.5	.5	.5	--
Shoulder Width (ft.)	--	--	--	--	4	--	--	--	--	2
Median Widths (ft.)										
Raised Curb	2	--	2	--	--	2	--	2	--	--
With Left Turn	12	--	12	--	--	10	--	10	--	--
Border Area Width (ft.)	EXISTING					EXISTING				
Vertical Clearance (ft.)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
(6) Horizontal Clearance (ft.)	1.5	1.5	1.5	1.5	10	1.5	1.5	1.5	1.5	10
(7) Bridge Width, Existing (ft.)	44	22	40	20	22	44	22	40	20	22

NOTES:

(1) According to existing Federal Functional Classification.
(2) Design Speed should be equal to or greater than posted speed, if practicable.
(3) Distance required by the driver (height of eye = 3.5') traveling at the design speed to bring vehicle to a stop after an object (6 inches) on the road becomes visible.
(4) Degree of horizontal curves should be compatible with the design speed.
(5) Gutter width may be included as part of the parking lane width.
(6) Horizontal clearance measured from the back of curb; from travel lane on rural section. Fixed objects (utility poles, traffic signal supports, etc.) which are to be newly installed or physically relocated because of the project, should be placed at the right–of–way line or at a clearance of ten feet.
(10) Bridge width should be, at least, equal to width of travel way and design loading should be, at least, HS–15. Guardrail and bridge rails which are structurally deficient and functionally obsolete should be reviewed for possible upgrading.

Iterim Metric

August 1994

URBAN DESIGN AIDS

These aids are presented to help in the design of new or completely reconstructed nonprimary city streets when federal-aid funds are utilized. Each design element of each project should reflect the most practicable and economically justified value. Proposed design criteria between this table and the "Alternative Urban Design Guides" Table need to be reviewed with the Iowa DOT.

(1) TYPE FACILITY	ARTERIAL					COLLECTOR					LOCAL				
TYPE AREA	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL
(2) Traffic Lanes (number)	4	2	4	2	2	4	2	4	2	2	4	2	4	2	2
(3) Design Speed (km/h)	60	60	80	60	90	60	60	60	60	80	50	50	50	50	70
Stopping Sight Distance (m)	80–90	80–90	120–140	80–90	140–170	80–90	80–90	80–90	80–90	120–140	60–70	60–70	60–70	60–70	100–120
(4) Min.Radius (m)	150	150	280	150	305	150	150	150	150	230	100	100	100	100	175
(5) Max. Gradient (percent)	5	5	7	8	5	5	5	9	9	6	5	5	9	11	7
Travel Lane Width (m)	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.3	3.3	3.3
(6) Parking Lane Width (m)	3.6	3.6	3.3	3.3	--	3.0	3.0	3.0	3.0	--	3.0	3.0	2.7	2.7	--
(7) Curb & Gutter Width (m)	0.8	1.1	0.8	1.1	--	0.8	1.1	0.8	0.8	--	0.8	0.8	0.8	0.8	--
Shoulder Width (m)	--	--	--	--	2.4	--	--	--	--	2.4	--	--	--	--	1.8
Median Widths (m)															
Raised Curb	1.8	--	1.8	--	--	1.2	--	1.2	--	--	1.2	--	1.2	--	--
With Left Turn	4.8	--	4.8	--	--	4.8	--	4.8	--	--	4.2	--	4.2	--	--
(8) Border Area Width (m)	3.6	3.6	3.6	3.6	--	3.3	3.3	3.3	3.3	--	3.0	3.0	3.0	3.0	--
Vertical Clearance (m)	5.0	5.0	5.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
(9) Horizontal Clearance (m)	3.0	3.0	3.0	3.0	RDG	3.0	3.0	3.0	3.0	RDG	3.0	3.0	3.0	3.0	3.0
(10) Bridge Width, New (m)															
(11) Bridge Width, Existing (m)															

NOTES:

(1) According to existing Federal Functional Classification.
(2) Actual number of lanes based on highway capacity--more than four lanes refer to AASHTO "Policy" (Greenbook).
(3) Design Speed should be posted speed plus 10 km/h, if practicable.
(4) Urban areas based on e = 0.04 and rural on e = 0.08.
(5) Maximum Gradient may be steepened by 2 percent for short distances (< 150 m) and on one-way down grades.
(6) Gutter width may be included as part of the parking lane width.
(7) Curbs should be mountable when the posted speed is 70 km/h or more, if practicable.
(8) Border area is the area between the roadway and the right-of-way line. Usually includes sidewalk at least 1.2 m in width.
(9) RDG = Roadside Design Guide. Horizontal clearance measured from the back of curb; from travel lane on rural section.
(10) Bridge width should be, at least, equal to approach width (curb to curb width or lane widths plus shoulder width). One sidewalk should be extended across structure. Guardrail should be installed when posted speed is over 60 km/h. Design Loading should be MS-18.
(11) Bridge width should be, at least, equal to traveled way width plus 0.6 m on both sides and design loading should be, at least, MS-13.5; except local may be M-13.5. Guardrail and bridge rails which are structurally deficient and functionally obsolete should be reviewed for possible upgrading.

August 1994

Interim Metric

ALTERNATIVE URBAN DESIGN GUIDES

These guides are presented as alternative design criteria for new or completely reconstructed nonprimary city streets when federal aid funds are utilized. Design exceptions below the values shown in this table will be considered on a project by project basis, provided that each exception is justified to the Iowa DOT.

(1) TYPE FACILITY	ARTERIAL					COLLECTOR					LOCAL				
TYPE AREA	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL
(2) Traffic Lanes (number)	4	2	4	2	2	4	2	4	2	2	4	2	4	2	2
(3) Design Speed (km/hr)	50	50	60	50	70	50	50	50	50	60	30	30	30	30	50
Stopping Sight Distance(m)	60–70	60–70	80–90	60–70	100–120	60–70	60–70	60–70	60–70	80–90	30	30	30	30	60–70
(4) Min. Radius (m)	100	100	150	100	175	100	100	100	100	125	35	35	35	35	80
(5) Max. Gradient (percent)	8	8	8	9	7	8	8	10	11	8	8	8	11	12	10
Travel Lane Width (m)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.0	3.0	3.3	3.3	3.3	3.0	3.0	3.0
(6) Parking Lane Width (m)	3.0	3.0	2.4	2.4	--	2.4	2.4	2.1	2.1	--	2.4	2.4	2.1	2.1	--
(7) Curb & Gutter Width (m)	0.5	0.5	0.5	0.5	--	0.5	0.5	0.5	0.5	--	0.5	0.5	0.5	0.5	--
Shoulder Width (m)	--	--	--	--	2.4	--	--	--	--	1.8	--	--	--	--	1.2
Median Widths (m)															
Raised Curb	1.2	--	1.2	--	--	0.6	--	0.6	--	--	0.6	--	0.6	--	--
With Left Turn	4.2	--	4.2	--	--	3.6	--	3.6	--	--	3.3	--	3.3	--	--
(8) Border Area Width (m)	2.4	2.4	2.4	2.4	--	2.4	2.4	2.4	2.4	--	1.5	1.5	1.5	1.5	--
Vertical Clearance (m)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
(9) Horizontal Clearance (m)	0.9	0.9	0.9	0.9	3	0.6	0.6	0.6	0.6	3	0.5	0.5	0.5	0.5	3
(10) Bridge Width, New (m)															
(11) Bridge Width, Existing (m)															

NOTES:

(1) According to existing Federal Functional Classification.

(2) Actual number of lanes based on highway capacity--more than four lanes refer to AASHTO "Policy" (Greenbook).

(3) Design Speed should be equal to or greater than posted speed.

(4) Urban areas based on e = 0.04 and rural on e = 0.08. With design speeds of 50 km/h of less, conditions may warrant elimination of superelevation.

(5) Maximum Gradient may be steepened by 2 percent for short distances (< 150 m) and on one-way down grades.

(6) Gutter width may be included as part of the parking lane width.

(7) Curbs should be mountable when the posted speed is 80 km/h or more.

(8) Border area is the area between the roadway and the right-of-way line. Usually includes sidewalk at least 1.2 m in width.

(9) Horizontal clearance measured from the back of curb; from travel lane on rural section. Fixed objects (utility poles, traffic signal supports, etc.) which are to be newly installed or physically relocated because of the project, should be placed at the right-of-way line or at a clearance of 3 m.

(10) Bridge width should be, at least, equal to approach width. Long structures (>60 m) equal to travel way plus 1.2 m on both sides. One sidewalk should be extended across structure. Guardrail should be installed when posted speed is over 60 km/h. Design Loading should be MS-18.

(11) Bridge width should be, at least, equal to width of travel way and design loading should be, at least, MS-13.5; except local may be M-13.5. Guardrail and bridge rails which are structurally deficient and functionally obsolete should be reviewed for possible upgrading.

Interim Metric

August 1994

URBAN 3R GUIDELINES

This table contains acceptable values for 3R federal–aid projects on nonprimary city streets. Each project is to be considered individually to determine what improvements are feasible to extend the useful life of the existing streets and enhance safety. Values below these will be considered on a project by project basis provided that each exception is justified to the Iowa DOT.

(1) TYPE FACILITY	ARTERIAL					COLLECTOR				
TYPE AREA	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL	COMMERCIAL OR INDUSTRIAL		FRINGE OR RESIDENTIAL		RURAL
Traffic Lanes (number)	4	2	4	2	2	4	2	4	2	2
(2) Design Speed (km/h)	EXISTING					EXISTING				
(3) Stopping Sight Distance (m)	BASED ON DESIGN SPEED					BASED ON DESIGN SPEED				
(4) Min. Radius (m)	BASED ON DESIGN SPEED					BASED ON DESIGN SPEED				
Max. Gradient (percent)	EXISTING					EXISTING				
Travel Lane Width (m)	3.3	3.3	3.0	3.0	3.3	3.3	3.3	3.0	3.0	3.3
(5) Parking Lane Width (m)	2.7	2.7	2.4	2.4	--	2.4	2.4	2.1	2.1	--
Shoulder Width (m)	--	--	--	--	1.2	--	--	--	--	0.6
Median Widths (m)										
Raised Curb	0.6	--	0.6	--	--	0.6	--	0.6	--	--
With Left Turn	3.6	--	3.6	--	--	3.0	--	3.0	--	--
Border Area Width (m)	EXISTING					EXISTING				
Vertical Clearance (m)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
) Horizontal Clearance (m)	0.5	0.5	0.5	0.5	3.0	0.5	0.5	0.5	0.5	3.0
(7) Bridge Width, Existing (m)										

NOTES:

(1) According to existing Federal Functional Classification.

(2) Design Speed should be equal to or greater than posted speed, if practicable.

(3) Distance required by the driver (height of eye = 1,070 mm) traveling at the design speed to bring vehicle to a stop after an object (150 mm) on the road becomes visible.

(4) Degree of horizontal curves should be compatible with the design speed.

(5) Gutter width may be included as part of the parking lane width.

(6) Horizontal clearance measured from the back of curb; from travel lane on rural section. Fixed objects (utility poles, traffic signal supports, etc.) which are to be newly installed or physically relocated because of the project, should be placed at the right–of–way line or at a clearance of 3 m.

(7) Bridge width should be, at least, equal to width of travel way and design loading should be, at least, MS–13.5. Guardrail and bridge rails which are structurally deficient and functionally obsolete should be reviewed for possible upgrading.

DESIGN EXCEPTION PROCESS

FOR

CITY FEDERAL AID PROJECTS

Prepared By
Larry R. Jesse, P.E.
Office of Local Systems
Iowa Department of Transportation
October 1992
Revised December 1997

INTRODUCTION.

Design criteria for city federal aid projects was updated in response to the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. This update was accomplished by the Iowa DOT's Office of Local Systems with reviews by various city representatives. The design criteria was organized into three tables; Urban Design Aids (Aids), Alternative Urban Design Guides (Guides), and Urban 3R Guidelines (3R). The tables are to assist designers of nonprimary city federal aid street or bridge projects. They should not be considered as hard and fast standards. Each design element should reflect the highest value practicable in order to satisfy the demands for service in the safest and most economical manner.

The purposes of these tables are as follows:

1. Urban Design Aids Table. - This table (attached) is used in the initial stages of project development on new or complete reconstruction projects. Individual projects may need design elements higher or lower than those listed.

2. Alternative Urban Design Guides Table. - This table(attached) shows the design criteria acceptable when factors limit the city's ability to use higher values.

3. Urban 3R Guidelines Table. - This table (attached) displays acceptable design values for Rehabilitation, Restoration, or Resurfacing (3R) projects.

FACTORS TO CONSIDER.

City officials consider either directly or indirectly many factors when deciding the type or extent of improvement needed on a street or bridge. Some of these factors are:

1. Pavement Condition. - The type of pavement improvements needed and the existing street conditions dictate what improvements are practical. Upgrading geometrics may be appropriate if the total pavement improvement is substantial. When pavement improvements are relatively minor, it may not be economical to make major changes.

2. Physical Characteristics. - The physical characteristics of a street and its location often determine what improvements are desirable, practical, or cost effective. Topography, adjacent development, existing alignment, and cross-section should be considered when determining the scope of geometric or safety improvements.

3. Traffic Volumes. - Traffic data (volume, truck percentage) are important considerations in the determination of the appropriate level of improvement (reconstruct vs. 3R), and in the selection of the geometrics (4-lane, street width, etc.).

4. Functional Classification. - Drivers associate and expect certain geometrics and levels of design with each functional class.

5. Traffic Control and Regulations. - Traffic regulations, positive guidance techniques (signs, markings), and traffic operational improvements can postpone costly reconstruction. These techniques can reduce or eliminate adverse safety and operational features of existing streets.

6. Safety Enhancement. - Safety is an essential consideration for all proposed federal aid projects. Projects should be developed in a manner which considers appropriate safety improvements.

7. Accident Records. - Evaluation of accident records may reveal problems requiring special attention. This evaluation is an integral part of project development.

8. Economics. - The economics of a project is a major factor in determining the priority and scope of work. This is especially true of 3R projects which prolong and preserve the service life of existing streets. 3R projects should protect the investment in and derive the maximum economic benefit from the existing street. They should also enhance safety where feasible.

9. Potential Impacts. - Projects are influenced by potential impacts on the surrounding land and development. Social, environmental, and economic impacts may limit the scope of projects. This may be especially true on 3R projects where existing right of way is narrow and there is adjacent development.

10. Other Factors. - Maximum benefit for the dollar invested, compatibility with adjacent sections of unimproved streets, and the probable time before reconstruction are other factors which could be considered.

After considering various factors, the city officials may find themselves in a position where a proposed improvement doesn't meet one or more of the design elements in the tables.

A project involving new construction or complete reconstruction where the design elements will not meet or exceed the Design Aids values, will need to be reviewed with the Iowa DOT. The reasons for the lower values and the project characteristics need to be provided to the DOT. The District Local Systems Engineer and Urban Systems Projects Engineer will review the reasons as to their appropriateness. They may determine that other alternatives or countermeasures should be considered.

If the design elements don't meet or exceed the values in the Design Guides table, for 3R work the 3R Guidelines table, a design exception must be requested. The design exception must be justified through the design exception process.

DESIGN EXCEPTION PROCESS.

Any request to consider a design exception should include what the exception is and why it is requested. An analysis of the accident history and a review of the economics, needs to be included. Also, any proposed mitigation that is in the design should be noted in the request. The steps involved in the development of the design exception request are outlined on the following pages.

Step 1 - List the Design Exception(s).

All design elements of the proposed project need to be compared to the Design Guides table for new or complete reconstruction projects, and to the 3R Guidelines table for 3R projects. Individual design values, considered to be lower than the values in these tables, will need to be listed as design exceptions.

Step 2 - Analyze the Accidents.

A printout listing the accidents that have occurred within the project termini can be obtained through ALAS (Accident Location Analysis System) by contacting the Bureau of Transportation Safety at (515) 239-1668. The request for an ALAS printout should be for five (5) years. A three (3) year request is acceptable when the street has high traffic volumes (3,000+ vpd), a large number of accidents, or if a traffic operational change has taken place. The city may also supplement the ALAS data with their own accident data.

Accidents should be reviewed with respect to the location, rate, severity, type, contributing circumstances, time period, and environmental conditions. Accidents with roadway or environmental contributing circumstances should receive special attention. But, accidents with driver or vehicle contributing circumstances should not be ignored. Even if an accident is the driver's fault (drunk, speeding, ran stop sign, etc.), a look at roadway changes (utility pole relocations, etc.) to lessen accident severity is desirable.

Obtaining copies of accident reports will provide additional information; especially reports with fatalities, major injuries, or numerous injuries The reports could be reviewed with local law enforcement personnel to get their perspective. Locations with severe accidents, above average number of accidents, or above average accident rates should be field checked.

Step 3 - Prepare a Cost Estimate.

A cost estimate to bring the deficiency or deficiencies up to current urban Design Aids values needs to be prepared. This estimate does not need to be precise. A complete redesign with exact quantities isn't needed. It can be based on the "average' conditions as in the average right of way needed, the average cost per block to move utility poles, etc. This estimate should be based on upgrading the deficiency to the current Design Aids values, not to just the minimum level needed to develop this project.

Step 4 - Perform an Economic Analysis.

Various methods (Cost Effectiveness, Benefit/Cost Ratio, Rate of Return, Time of Return, and Net Annual Benefit) are available to determine the economic feasibility of an improvement. A simplistic Benefit/Cost (B/C) Ratio will be presented under this step. This B/C Ratio is the ratio of expected benefits accrued from an accident/severity reduction, to the cost (construction, right of way, engineering, etc.) .

of the improvement. Included in this report are two forms which may be utilized to determine this B/C Ratio. Figure #1 with million entering vehicles (MEV) should be utilized for the majority of urban projects. Figure #2 can be used when the termini are over one-half mile apart; the accident rates are determined per 100 million vehicle miles (HMVM).

The information required to fill out the forms is as follows:

1. ACCIDENT DATA. The accident data on the ALAS printout should be transferred to the appropriate blanks on the form. The number of fatalities or injuries may not be the same number of these types of accidents (two personal injury accidents could involve five injuries). The actual property damage of all accidents should be totaled and entered in the appropriate blank. The value of $1,000 per accident, if no property damage is recorded, should be used. All accidents within the project termini or at the spot location should be initially included.

2. IMPROVEMENT BEING CONSIDERED. The improvement described and the cost estimate should only be for the work for which the B/C Ratio is being determined. In other words, the cost to bring the deficiency up to the design criteria under the Design Aids table, not the total project costs.

3. SERVICE LIFE AND ACCIDENT/SEVERITY REDUCTION FACTORS. Tables are included listing estimated values for these items for both city streets (Table 1) and rural roadway sections within urban areas (Table 2). Unless otherwise noted, the accident/severity reduction percentage is based on all accidents.

   Accident/Severity reduction factors are usually provided for a single countermeasure. However, where multiple countermeasures are being proposed, the reduction factor will be a combination of the individual factors. Since it is not feasible to reduce accidents by more than 100 percent, the following formula is used. It develops an overall accident/severity reduction factor for multiple improvements at a location or along a route.

$$AR_M = AR_1 + (1-AR_1)\,AR_2 + (1-AR_1)(1-AR_2)\,AR_3 + \ldots\ldots\ldots$$

$$+ (1-AR_1)(1-AR_{i-1})\,AR_i$$

   where: AR_M = overall accident/severity reduction factor for multiple improvements.

   AR_i = accident/severity reduction factor for specific improvement or countermeasure.

   i = number of improvements.

   Example.

   An example of the use of the multiple improvement formula is shown for three improvements at a single location with individual reduction factors of :

$AR_1 = 0.45$; $AR_2 = 0.30$; and $AR_3 = 0.15$;

The overall accident/severity reduction factor is:

$$AR_M = AR_1 + (1-AR_1)\ AR_2 + (1-AR_1)\ (1-AR_2)\ AR_3$$
$$= 0.450 + (1-0.45)(0.30) + (1-0.45)(1-0.30)(0.15)$$
$$= 0.450 + 0.165 + 0.058$$
$$= 0.673 = 0.67$$

Most studies indicate that a B/C Ratio over 1.0 is considered beneficial and under 1.0 is not. However, when estimated values are being utilized, we consider an improvement with a B/C Ratio over 1.20 cost effective. Under 0.80 it is probably not cost-effective to do the improvement. A more in-depth review is in order for ratios from 0.80 to 1.20, inclusive. This review should include the following items:

1. The accident rate determined in the forms should be compared to similar facilities within the city or around the state.

2. The type of accidents should be reviewed against the type of improvement. Will the improvement being considered affect the type of or majority of accidents which occurred within the project limits?

3. The severity of the accidents should be reviewed with respect to location. If most of the accidents along the route were PDO's and one location had a number of injury or fatality accidents then a review of that particular "spot" location may be in order.

4. The cost of the improvement being considered should be compared with the project cost without the improvement. If the cost to upgrade a deficiency is minor compared to the total project cost then it may be wise to include the additional improvement. If the cost to upgrade would be a major expense such as doubling the cost of the project, it may be desirable to program the additional improvement at some future time.

5. The environmental or social effects of the improvement should always be considered. Relocation of families, adverse effects on wetlands or parks, and disturbance of historical or archaeological areas are just a few examples.

6. Other alternatives that could result in a similar benefit should also be investigated.

If the B/C Ratio is over 1.20, then a design exception may not be granted unless there are extenuating circumstances. One example of an extenuating circumstance may be that the severe accidents occurred at a certain location(s). The city officials propose an improvement(s) at this location(s) and without these accidents the B/C Ratio is below 0.80. Another circumstance may be that the work will be accomplished the following year.

Step 5 - Provide Reason(s) or Justification(s) and Mitigation(s).

The cover letter requesting the exception should include the City's reason(s) or justification(s) for the design exception(s). In many cases some form of mitigation can be accomplished to lessen any adverse impacts that may result from the lower design criteria. The mitigation should also be outlined in the cover letter. Some examples of reasons and mitigations are as follows:

> Example #1. - Although the maximum gradient is two percent more than the value in the Design Guides, it isn't possible to flatten the grade without disturbing the historical church. We propose installing Hill signs (MUTCD #W7-1) to alert the trucks going to the industrial park. Also, the church driveway will be relocated to obtain the maximum sight distance.
>
> Example #2. - The location of the railroad underpass and homes makes it impractical to reconstruct the horizontal curve. Since the most severe accident at the curve involved a utility pole, we plan to relocate the pole to the inside of the curve.

It is important for the city officials to list their reasons or justifications and any mitigation they may propose. These should be included in the cover letter even if there is a favorable B/C Ratio. The B/C Ratio is a tool in deciding whether an improvement is economically feasible. But it should not be the city's only basis for asking for a design exception.

SUMMARY:

Any request to consider a design exception should include the following:

1. State the exception(s).
2. Analyze the accident history.
3. Determine the B/C Ratio.
4. State the City's reason(s) or justification(s).
5. State the City's proposed mitigation(s).
6. Submit all documentation (ALAS printout, B/C determination form and cover letter.

The request should be sent to the appropriate District Local Systems Engineer who will review the exception. He/She will make a recommendation for approval or disapproval. The recommendation along with the above data will be forwarded to the Office of Local Systems. The Urban Systems Engineer or her/his designee will make the final approval or disapproval. He/She will notify the District Local Systems Engineer of the determination with a copy to the City.

Figure #1
BENEFIT/COST DETERMINATION CITY_____
(City Street)

Project No._____ Date_____

Location_____ Prepared by_____

Length_____miles Current ADT_____

ACCIDENT DATA: From _____ to _____, Total # _____years
(date) (date)

Fatal Accidents _____ # Fatalities _____ x $800,000 = $_____

Injury Accidents _____ # Major Injuries _____ x $120,000 = $_____

Minor Injuries _____ x $ 8,000 = $_____

Possible Injuries _____ x $ 2,000 = $_____

PDO Accidents _____ Actual Prop. Dam. (Total) = $_____
(Use $2,000/Acc. if none given)

(1) Total # Acc. _____ (2) Total Loss = $ _____

(3) Cost/Acc. = $\frac{(2)}{(1)}$ = Total Loss/Total # Acc. = $ _____/accident

(4) Acc. Rate = $\frac{\text{Total \# Acc. x 1,000,000}}{\text{ADT x years x 365}}$ = _____ Acc./MEV

DESIGN EXCEPTION BEING CONSIDERED:
Description of Improvement: (not project description)

(5) Estimated Cost Imp. $_____ (Thousand)

(5A) Estimated Service Life (E.S.L.) ____years

(5B) Estimated Overall Accident/Severity Reduction Factor_____percent
See #3 Page 2

B/C ANALYSIS:
(6) Estimated Traffic Volume =

$$\text{ADT} \times \frac{1+(1.02)^{(5A)}}{2} \times (5A) \times .000365 = \_\_\_\_\_ \text{ MEV}$$

(7) Total Accident Loss = (3) x (4) x (6) =

Cost/ Acc. x Acc. Rate x Est. Traf. Vol. = _____ (thousand)

(8) Total Acc. Benefit = (7) x (5B) =

Tot. Acc. Loss x Est. % Acc. Reduction = _____ (thousand)

Benefit/Cost Ratio = $\frac{(8)}{(5)} = \frac{\text{Tot. Acc. Benefit}}{\text{Est. Cost Imp.}}$ = _____

Figure #2
BENEFIT/COST DETERMINATION CITY _____
(Over 0.5 mile in length)

Project No._____ Date_____

Location_____ Prepared by_____

Length(miles)_____ Current ADT_____

ACCIDENT DATA: From _____ (date) to _____ (date), Total # _____ years

Fatal Accidents _____ # Fatalities _____ x $800,000 = $_____

Injury Accidents _____ # Major Injuries _____ x $120,000 = $_____

Minor Injuries _____ x $ 8,000 = $ _____

Possible Injuries _____ x $ 2,000 = $ _____

PDO Accidents _____ Actual Prop. Dam. (Total) = $ _____
(Use $2,000/Acc. if none given)

(1) Total # Acc. _____ (2) Total Loss = $ _____

(3) Cost/Acc. = $\frac{(2)}{(1)}$ = Total Loss/Total # Acc. = $ _____/accident

(4) Acc. Rate = $\frac{\text{Total \# Acc. x 100,000,000}}{\text{ADT x Length x years x 365}}$ = _____ Acc./HMVM

DESIGN EXCEPTION BEING CONSIDERED:
Description of Improvement: (not project description)

(5) Estimated Cost Imp. $_____ (Thousand)

(5A) Estimated Service Life (E.S.L.) ____years

(5B) Estimated Overall Accident/Severity Reduction Factor _____ percent
See #3 page 2

B/C ANALYSIS:

(6) Estimated Traffic Volume =

$$\text{ADT} \times \frac{1+(1.02)^{(5A)}}{2} \times (5A) \times \text{Length} \times 0.00000365 = \_\_\_\_\_ \text{HMVM}$$

(7) Total Accident Loss = (3) x (4) x (6) =

Cost/ Acc. x Acc. Rate x Est. Traf. Vol. = _____ (thousand)

(8) Total Acc. Benefit = (7) x (5B) =

Tot. Acc. Loss x Est. % Acc. Reduction = _____ (thousand)

Benefit/Cost Ratio = $\frac{(8)}{(5)}$ = $\frac{\text{Tot. Acc. Benefit}}{\text{Est. Cost Imp.}}$ = _____

Table 1
IMPROVEMENTS FOR
CITY STREETS

	Estimated Service Life (Years)	Estimated Accident/ Severity Reduction Factor (%)
Intersections:		
Channelize/Add Turning Lanes	15	20
Improve Sight Distance	15	30
Upgrade Signs/Markings	6/2	30
New Signs/Markings	6/2	50
Illuminate	15	25
Reconstruct	20	40
Increase Turning Radii	15	15
Signalization new/upgrade	15/10	20
Improve Signal Timing/Phasing	5	10
Curves:		
Vertical Realignment	20	30
Horizontal Realignment	20	20
Horizontal/Vertical Realignment	20	50
Structures:		
Widen (lengthen culverts)	20	40
Guardrail (speed limit > 35mph)	15	20
Impact Attenuator (speed > 35mph)	15	15
Replace	50	40
Eliminate	50	75
Upgrade Bridge Rail (speed > 35mph)	15	10

Table 1
IMPROVEMENTS FOR
CITY STREETS

	Estimated Service Life (Years)	Estimated Accident/ Severity Reduction Factor (%)	
Railroad Crossing:			
Signalize w/gates	10	65 75	Train Accidents
RR Pavement Markings	2	10	
Replace with Grade Separation	50	40	
Other:			
New Median Barrier	20	15	
Delineate	6	10	
Flatten Foreslopes	20	25	
Relocate Utility Poles:			
4' offset to 7'	10	42	
4' offset to 10'	10	60	Pole Accidents
4' offset to 15'	10	73	
7' offset to 10'	10	31	
7' offset to 15'	10	54	
10' offset to 15'	10	33	

Table 2
IMPROVEMENTS FOR
RURAL ROADWAY SECTIONS
WITHIN URBAN AREAS

	Estimated Service Life (Years)	Estimated Accident/ Severity Reduction Factor (%)
Add Lane(s)	20	05
Widen Pavement	20	20
Widen Shoulder	20	10
Widen Pavement/Shoulder	20	30
Flatten Foreslopes	20	15
Widen Shoulder/Flatten Foreslopes	20	25
Friction Improvement		
Overlay	10	25
P. C. Grooving	10	10
Signing	6	05
Edgeline Markings	2	05
Horizontal Realignment	20	20
Vertical Realignment	20	30
Horizontal/Vertical Realignment/ Correct Superelevation	20	50
Roadway Lighting	15	25
Relocate Driveways	20	10
Flatten Entrance Slopes	20	05
Right of Way	100	--

Iowa Department of Transportation

INSTRUCTIONAL MEMORANDUM
TO COUNTY ENGINEERS

TO	DATE
County Engineers	October 30, 1992
FROM	**IM No.**
Office of Local Systems	3.210

SUBJECT

DESIGN CRITERIA--NEW CONSTRUCTION OR COMPLETE RECONSTRUCTION

Plan review for Secondary Road projects shall be based on the current AASHTO book "A Policy on Geometric Design of Highways and Streets". It contains acceptable design guides. Chapter V will apply to local roads (Area Service) and Chapter VI will apply to Farm to Market (collector) routes.

The objective in design of any engineered facility to be used by the public is to satisfy the demands for service in the safest and most economical manner. Values approaching or exceeding the upper limits of the ranges should be used as the basis for design wherever conditions permit. However, values within the ranges are acceptable.

On new or complete reconstruction projects the selected design speed should be consistent with the proposed or existing regulatory speed limit. Any individual curves below this design speed may require mitigation by placement of warning signs and/or markings such as: curve or turn signs, advisory speed plates, chevrons, no passing lines, edgelines or reduced speed zones.

Included with this I.M. are Design Aids for both the Farm to Market System and the Local Road System, which are to be used in the initial stages of project development. The county engineer should justify any proposed project which will not follow or meet the FM Design Aids, or the Area Service Aids when federal funds are utilized. Also included are Tables to reflect the AASHTO Design Guides. Any proposed project which does not meet these guides may require additional justification to the Iowa DOT. Justification will need to be in the form of safety and service (accident experience, function of road, etc.) benefits versus the economics and environment (right of way and construction costs, farmsteads affected, parks, etc.). Please refer to I.M. 3.218 for the Design Exception Process.

October 1992

FARM TO MARKET DESIGN AIDS
FOR NEW OR COMPLETELY RECONSTRUCTED RURAL FARM TO MARKET ROADS

These "Aids" are presented to help in the design of roads on the Farm to Market Systems. Each design element of each project should reflect the most practicable and economically justified value. Design exceptions below the design criteria set out in the current edition of AASHTO, "A Policy on Geometric Design of Highways and Streets", Chapter VI, will be considered on a project by project basis, provided that each exception is justified to the Iowa DOT.

DESIGN ELEMENTS	PAVED ROADWAY									NON-PAVED ROADWAY					
(1) ADT--DHV Year	Over 200			200 to 100						600 to 100			under 100		
--Design Year (20 yrs)	Over 1500			1500 to 600			under 600			400 to 50			under 50		
--Current Year	Over 1000			1000 to 400			under 400								
(2) TERRAIN	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly
DESIGN SPEED mph	60	--	50	55	--	50	55	--	45	55	--	45	50	--	40
STOPPING SIGHT DISTANCE ft	650	--	475	550	--	475	550	--	400	550	--	400	475	--	325
(3) MAXIMUM CURVATURE degrees	4.75	--	7.5	6	--	7.5	6	--	9.5	6	--	9.5	7.5	--	12.25
(4) MAXIMUM GRADIENT %	5	--	6	5	--	7	6	--	7	6	--	8	7	--	8
PAVEMENT/SURFACING WIDTH ft	24			22			22			20			20		
SHOULDER WIDTH ft	8			6			6			4			2		
ROADWAY TOP WIDTH ft	40			34			34			28			24		
(5) BRIDGE WIDTH--NEW ft	40			30			30			24			24		
(6) BRIDGE WIDTH--EXISTING ft	24			22			22			22			22		
FORESLOPE	4:1			3:1			3:1			3:1			3:1		
CROSS SLOPES	8:1			6:1			6:1			3:1			3:1		
(7) CLEAR ZONE ft	40'(TW)	--	26'(TW)	12'(TS)	--	10'(TS)	8'(TS)	--	6'(TS)	10'(TS)	--	8'(TS)	8'(TS)	--	6'(TS)

NOTES:

(1) a. Over 3000 ADT (Design Year), Use AASHTO DHV "over 400" values.
b. Design Year ADT governs.

(2) Prevailing (over 50%) slopes of natural ground are: Flat--3% or less, Rolling--between 3% and 9%, Hilly--9% or more.

(3) a. Based on a maximum e of .08.
b. Horizontal Curves should have a minumum length of 500 feet.

(4) Maximum Gradient may be steepened by two percent for short distance (less than 500 feet).

(5) a. If over 100 ft long, may be pavement width plus six feet.
b. Bridges should have a Design Loading of HS-20.

(6) a. For bridges less than 100 ft. in length. Over 100 ft. will be analyzed individually.
b. Over 3000 ADT (Design Year), use 28'.
c. Design Loading should be HS-15.
d. Existing bridge width is considered to be at least pavement width.

(7) CLEAR ZONE according to Roadside Design Guide.
- Measured from edge of Traveled Way.

October 1992

AASHTO GUIDELINES
FOR RURAL COLLECTORS

These "Guides" are a composite of the design guides in Chapter VI of the 1990 AASHTO "Policy" (Greenbook).

DESIGN ELEMENTS	ALL COLLECTOR ROADS									
(1) ADT--DHV	Over 400		200 - 400		100 - 200					
--Design Year (20 yrs.)	Over 3000		1500 - 3000		750 - 1500		600 - 750		0 - 600	
--Current Year	Over 2000		1000 - 2000		500 - 1000		Over 400		0 - 400	
(2) TERRAIN	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling
DESIGN SPEED mph	60	50	60	50	50	40	50	40	40	30
STOPPING SIGHT DISTANCE ft	525-650	400-475	525-650	400-475	400-475	275-325	400-475	325	275-325	200
(3) MAXIMUM CURVATURE degrees	4.75	7.5	4.75	7.5	7.50	12.25	7.50	12.25	12.25	22.75
(4) MAXIMUM GRADIENT %	5	7	5	7	6	8	6	8	7	9
PAVEMENT/SURFACING WIDTH ft	24	24	24	24	22	22	22	22	20	20
SHOULDER WIDTH ft	8	8	8	8	6	6	4	4	2	2
ROADWAY TOP WIDTH ft	40	40	40	40	34	34	30	30	24	24
(5) BRIDGE WIDTH--NEW ft	40	40	32	32	28	28	28	28	24	24
(6) BRIDGE WIDTH--EXISTING ft	28	28	24	24	22	22	22	22	22	22
FORESLOPE	3:1	3:1	3:1	3:1	3:1	3:1	3:1	3:1	3:1	3:1
(7) CLEAR ZONE (variable) ft	RDG	RDG	RDG	RDG	RDG	RDG	RDG	RDG	RDG	RDG

NOTES:

(1) Design Year ADT governs.

(2) AASHTO "Mountainous" terrain design guides maybe used only upon concurrance by the Iowa DOT.

(3) Based on a maximum e of .08.

(4) Maximum Gradient may be steepened by two percent (2%) for short distance--(less than 500')

(5) a. Bridges over 100 feet long and DHV over 200, width may be traveled way plus three feet (3') each side.
b. Design Loading should be HS-20

(6) a. For bridges less than 100 ft. in length, over 100 ft. will be analyzed individually.
b. Design Loading should be HS-15.
d. Existing bridge width is considered to be at least pavement width.

(7) a. Clear zone according to Roadside Design Guide (RDG).
b. Design speed of 40 mph or below should have a minimum clear zone of 10' from the edge of the pavement/surfacing.

October 1992

AREA SERVICE AIDS
FOR NEW OR COMPLETELY RECONSTRUCTED RURAL LOCAL SECONDARY ROADS

These "Aids" are presented to help in the design of federally funded projects on local roads. Each design element of each project should reflect the most practicable and economically justified value. Values below the design criteria set out in the current edition of AASHTO, "A Policy on Geometric Design of Highways and Streets", Chapter V, will be considered on a project by project basis, provided that each exception is justified to the Iowa DOT.

DESIGN ELEMENTS	ALL AREA SERVICE (LOCAL) ROADS														
(1) ADT --DHV Year	Over 200			200 to 100									under 100		
-- Design Year	Over 1500			1500 to 600			600 to 375			375 to 100			under 50		
-- Current Year	Over 1000			1000 to 400			400 to 250			250 to 50			under 50		
(2) TERRAIN	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly
DESIGN SPEED mph	55	--	50	55	--	45	50	--	45	50	--	40	40	--	35
STOPPING SIGHT DISTANCE ft	550	--	475	550	--	400	475	--	400	475	--	325	325	--	250
(3) MAXIMUM CURVATURE degrees	6	--	7.5	6	--	9.5	7.5	--	9.5	7.5	--	12.25	12.25	--	16.25
(4) MAXIMUM GRADIENT %	5	--	7	6	--	7	6	--	8	6	--	9	7	--	9
PAVEMENT/SURFACING WIDTH ft	24			22			22			20			20		
SHOULDER WIDTH ft	8			6			4			3			2		
ROADWAY TOP WIDTH ft	40			34			30			26			24		
(5) BRIDGE WIDTH--NEW ft	30			30			30			24			24		
(6) BRIDGE WIDTH--EXISTING ft	24			22			22			20			20		
FORESLOPE	4:1			3:1			2:1			2:1			2:1		
(7) CLEAR ZONE ft	10			10			10			10			10		

NOTES:

(1) a. Over 3000 ADT (Design Year), Use AASHTO DHV "over 400" values.
b. Design Year ADT governs

(2) Prevailing (over 50%) slopes of natural ground are: Flat--3% or less, Rolling--between 3% and 9%, Hilly--9% or more.

(3) a. Based on a maximum e of .08.
b. Horizontal Curves should have a minumum length of 500 feet.

(4) Maximum Gradient may be steepened by two percent for short distance (less than 500 feet).

(5) a. Over 3000 ADT (Design Year), use approach roadway width.
b. Bridges should have a Design Loading of HS-20

(6) a. For bridges less than 100 ft. in length. Over 100 ft. will be analyzed individually.
b. Over 3000 ADT (Design Year), use 28'.
c. Design Loading should be H-15. H-10 acceptable under 50 ADT.
d. Existing bridge width is considered to be at least pavement width.

(7) Distance measured from edge of the pavement/surfacing.

AASHTO [illegible]DELINES FOR LOCAL ROADS

These "Guides" are a composite of the design guides in Chapter V of the 1990 AASHTO " Policy" (Greenbook).

DESIGN ELEMENTS	ALL AREA SERVICE (LOCAL) ROADS											
(1) ADT --DHV Year	over 400		200 - 400		100 - 200							
--Design Year	over 3000		1500 - 3000		600 - 1500		375 - 600		100 - 375		under 100	
--Current Year	over 2000		1000 - 2000		400 - 1000		250 - 400		50 - 250		under 50	
TERRAIN	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling
DESIGN SPEED mph	50	40	50	40	50	40	40	30	30		30	20
STOPPING SIGHT DISTANCE ft	400-475	275-325	400-475	275-325	400-475	275-325	275-325	200	200		200	125
(2) MAXIMUM CURVATURE degrees	7.5	12.25	7.5	12.25	7.5	12.25	12.25	22.75	22.75		22.75	53.5
(3) MAXIMUM GRADIENT %	6	9	6	9	6	9	7	10	7-10		7	11
PAVEMENT/SURFACING WIDTH ft	24	24	24	22	22	22	20	20	18		18	18
SHOULDER WIDTH ft	8	8	6	6	6	6	2	2	2		2	2
ROADWAY TOP WIDTH ft	40	40	36	34	34	34	24	24	22		22	22
(4) BRIDGE WIDTH--NEW ft	40	40	30	28	28	28	24	24	22		22	22
(5) BRIDGE WIDTH--EXISTING ft	28	28	24	24	22	22	22	22	20		20	20
FORESLOPE	2:1	2:1	2:1	2:1	2:1	2:1	2:1	2:1	2:1		2:1	2:1
(6) CLEAR ZONE ft	10	10	10	10	10	10	10	10	10		10	10

NOTES:

(1) Design Year ADT governs.

(2) Based on a maximum e of .08.

(3) Maximum Gradient may be steepened by two percent (2%) for short distance--(less than 500 feet).

(4) Design Loading should be HS-20

(5) a. For bridges less than 100 ft. in length, over 100 ft. will be analyzed individually.

b. Design Loading should be H-15. H-10 acceptable under 50 ADT

c. Existing bridge width is considered to be at least pavement width.

(6) CLEAR ZONE = Measured from edge of pavement/surfacing.

December 1993

INTERIM METRIC FARM TO MARKET DESIGN AIDS
FOR NEW OR COMPLETELY RECONSTRUCTED RURAL FARM TO MARKET ROADS

These "Aids" are presented to help in the design of roads on the Farm to Market Systems. Each design element of each project should reflect the most practicable and economically justified value. Design exceptions below the design criteria set out in the current edition of AASHTO, "A Policy on Geometric Design of Highways and Streets", Chapter VI, will be considered on a project by project basis, provided that each exception is justified to the Iowa DOT.

DESIGN ELEMENTS	PAVED ROADWAY									NON-PAVED ROADWAY					
(1) ADT--DHV Year	Over 200			200 to 100											
--Design Year (20 yrs)	Over 1500			1500 to 600			under 600			600 to 100			under 100		
--Current Year	Over 1000			1000 to 400			under 400			400 to 50			under 50		
(2) TERRAIN	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly	Flat	Rolling	Hilly
DESIGN SPEED km/h	100	--	80	90	--	80	90	--	70	90	--	70	80	--	60
STOPPING SIGHT DISTANCE m	210	--	140	170	--	140	170	--	120	170	--	120	140	--	90
(3) MINIMUM RADIUS m	390	--	230	300	--	230	300	--	175	300	--	175	230	--	125
(4) MAXIMUM GRADIENT %	5	--	6	5	--	7	6	--	7	6	--	8	7	--	8
PAVEMENT/SURFACING WIDTH m	7.2			6.6			6.6			6.0			6.0		
SHOULDER WIDTH m	2.4			1.8			1.8			1.2			0.6		
ROADWAY TOP WIDTH m	12.0			10.2			10.2			8.4			7.2		
(5) BRIDGE WIDTH--NEW m	12.0			9.0			9.0			7.2			7.2		
(6) BRIDGE WIDTH--EXISTING m	7.2			6.6			6.6			6.6			6.6		
(7) FORESLOPE	1:4			1:3			1:3			1:3			1:3		
CROSS SLOPES	1:8			1:6			1:6			1:3			1:3		
(8) CLEAR ZONE m	12.0(TW)	--	8.0(TW)	3.5(TS)	--	3.0(TS)	2.5(TS)	--	1.5(TS)	3.0(TS)	--	2.5(TS)	2.5(TS)	--	1.5(TS)

NOTES:

(1) a. Over 3000 ADT (Design Year), Use AASHTO DHV "over 400" values.
    b. Design Year ADT governs.

(2) Prevailing (over 50%) slopes of natural ground are: Flat--3% or less, Rolling--between 3% and 9%, Hilly--9% or more.

(3) Based on a maximum e of .08.

(4) Maximum Gradient may be steepened by two percent for short distance (less than 150 m).

(5) a. If over 30 m long, may be pavement width plus 1.8 m.
    b. Bridges should have a Design Loading of HS-20.

(6) a. For bridges less than 30 m in length. Over 30 m will be analyzed individually.
    b. Over 3000 ADT (Design Year), use 8.5.
    c. Design Loading should be HS-15.
    d. Existing bridge width is considered to be at least pavement width.

(7) Vertical to horizontal

(8) CLEAR ZONE according to Roadside Design Guide. (Based on Slope, Design Speed, and Design Year ADT)
    a. TW - Measured from edge of Traveled Way.
    b. TS - Measured from Toe of Slope (Based on shoulder width in Table).

December 1993

INTERIM METRIC AASHTO GUIDELINES
FOR RURAL COLLECTORS

These "Guides" are a composite of the design guides in Chapter VI of the 1990 AASHTO "Policy" (Greenbook).

DESIGN ELEMENTS	ALL COLLECTOR ROADS									
(1) ADT--DHV	Over 400		200 - 400		100 - 750					
--Design Year (20 yrs.)	Over 3000		1500 - 3000		750 - 1500		600 - 750		0 - 600	
--Current Year	Over 2000		1000 - 2000		500 - 1000		Over 400		0 - 400	
(2) TERRAIN	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling
DESIGN SPEED km/h	100	80	100	80	80	60	80	60	60	50
STOPPING SIGHT DISTANCE m	160-210	120-140	160-210	120-140	120-140	80-90	120-140	80-90	80-90	60-70
(3) MINIMUM RADIUS m	390	230	390	230	230	125	230	125	125	80
(4) MAXIMUM GRADIENT %	5	7	5	7	6	8	6	8	7	9
PAVEMENT/SURFACING WIDTH m	7.2		7.2		6.6		6.6		6.0	
SHOULDER WIDTH m	2.4		2.4		1.8		1.2		0.6	
ROADWAY TOP WIDTH m	12.0		12.0		10.2		9.0		7.2	
(5) BRIDGE WIDTH--NEW m	12.0		9.8		8.5		8.5		7.2	
(6) BRIDGE WIDTH--EXISTING m	8.5		7.2		6.6		6.6		6.6	
(7) FORESLOPE	1:3		1:3		1:3		1:3		1:3	
(8) CLEAR ZONE (variable) m	RDG		RDG		RDG		RDG		RDG	

NOTES:

(1) Design Year ADT governs.

(2) AASHTO "Mountainous" terrain design guides maybe used only upon concurrance by the Iowa DOT.

(3) Based on a maximum e of .08.

(4) Maximum Gradient may be steepened by two percent (2%) for short distance--(less than 150 m)

(5) a. Bridges over 30 m long and DHV over 200, width may be traveled way plus 1 m each side.

b. Design Loading should be HS-20

(6) a. For bridges less than 30 m in length, over 30 m will be analyzed individually.

b. Design Loading should be HS-15.

d. Existing bridge width is considered to be at least pavement width.

(7) Vertical to horizontal

(8) a. Clear zone according to Roadside Design Guide (RDG).

b. Design speed of 60 km/h or below should have a minimum clear zone of 3 m from the edge of the pavement/surfacing.

December 1993

INTERIM METRIC AREA SERVICE AIDS
FOR NEW OR COMPLETELY RECONSTRUCTED RURAL LOCAL SECONDARY ROADS

These "Aids" are presented to help in the design of federally funded projects on local roads. Each design element of each project should reflect the most practicable and economically justified value. Values below the design criteria set out in the current edition of AASHTO, "A Policy on Geometric Design of Highways and Streets", Chapter V, will be considered on a project by project basis, provided that each exception is justified to the Iowa DOT.

DESIGN ELEMENTS	ALL AREA SERVICE (LOCAL) ROADS				
(1) ADT --DHV Year	Over 200	200 to 100	600 to 375	375 to 100	under 100
-- Design Year	Over 1500	1500 to 600	400 to 250	250 to 50	under 50
-- Current Year	Over 1000	1000 to 400			
(2) TERRAIN	Flat Rolling Hilly	Flat Rolling Hilly	Flat Rolling Hilly	Flat Rolling Hilly	Flat Rolling Hilly
DESIGN SPEED km/h	90 -- 80	90 -- 70	80 -- 70	80 -- 60	60 -- 50
STOPPING SIGHT DISTANCE m	170 -- 140	170 -- 120	140 -- 120	140 -- 90	90 -- 70
(3) MINIMUM RADIUS m	300 -- 230	300 -- 175	230 -- 175	230 -- 125	125 -- 80
(4) MAXIMUM GRADIENT %	5 -- 7	6 -- 7	6 -- 8	6 -- 9	7 -- 9
PAVEMENT/SURFACING WIDTH m	7.2	6.6	6.6	6.0	6.0
SHOULDER WIDTH m	2.4	1.8	1.2	1.0	0.6
ROADWAY TOP WIDTH m	12.0	10.2	9.0	8.0	7.2
(5) BRIDGE WIDTH--NEW m	9.0	9.0	9.0	7.2	7.2
(6) BRIDGE WIDTH--EXISTING m	7.2	6.6	6.6	6.0	6.0
(7) FORESLOPE	1:4	1:3	1:2	1:2	1:2
(8) CLEAR ZONE m	3	3	3	3	3

NOTES:

(1) a. Over 3000 ADT (Design Year), Use AASHTO DHV "over 400" values.
    b. Design Year ADT governs

(2) Prevailing (over 50%) slopes of natural ground are: Flat--3% or less, Rolling--between 3% and 9%, Hilly--9% or more.

(3) Based on a maximum e of .08.

(4) Maximum Gradient may be steepened by two percent for short distance (less than 150 m).

(5) a. Over 3000 ADT (Design Year), use approach roadway width.
    b. Bridges should have a Design Loading of HS-20

(6) a. For bridges less than 30 m in length. Over 30 m will be analyzed individually.
    b. Over 3000 ADT (Design Year), use 8.5.
    c. Design Loading should be H-15. H-10 acceptable under 50 ADT.
    d. Existing bridge width is considered to be at least pavement width.

(7) Vertical to horizontal

(8) Distance measured from edge of the pavement/surfacing.

December 1993

INTERIM METRIC AASHTO GUIDELINES
FOR LOCAL ROADS

These "Guides" are a composite of the design guides in Chapter V of the 1990 AASHTO " Policy" (Greenbook).

DESIGN ELEMENTS	ALL AREA SERVICE (LOCAL) ROADS											
(1) ADT --DHV Year	over 400		200 - 400		100 - 200		375 - 600		100 - 375		under 100	
--Design Year	over 3000		1500 - 3000		600 - 1500							
--Current Year	over 2000		1000 - 2000		400 - 1000		250 - 400		50 - 250		under 50	
TERRAIN	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling	Flat	Rolling
DESIGN SPEED km/h	80	60	80	60	80	60	60	50	50		50	40
STOPPING SIGHT DISTANCE m	120-140	80-90	120-140	80-90	120-140	80-90	80-90	60-70	60-70		60-70	50
(2) MINIMUM RADIUS m	230	125	230	125	230	125	125	80	80		80	50
(3) MAXIMUM GRADIENT %	6	9	6	9	6	9	7	10	7	10	7	11
PAVEMENT/SURFACING WIDTH m	7.2		7.2	6.6	6.6		6.0		5.4		5.4	
SHOULDER WIDTH m	2.4		1.8	1.8	1.8		0.6		0.6		0.6	
ROADWAY TOP WIDTH m	12.0		10.8	10.2	10.2		7.2		6.6		6.6	
(4) BRIDGE WIDTH--NEW m	12.0		9.0	8.5	8.5		7.2		6.6		6.6	
(5) BRIDGE WIDTH--EXISTING m	8.5		7.2	7.2	6.6		6.6		6.0		6.0	
(6) FORESLOPE	1:2		1:2	1:2	1:2		1:2		1:2		1:2	
(7) CLEAR ZONE m	3		3	3	3		3		3		3	

NOTES:

(1) Design Year ADT governs.

(2) Based on a maximum e of .08.

(3) Maximum Gradient may be steepened by two percent (2%) for short distance--(less than 150 m).

(4) Design Loading should be HS-20

(5) a. For bridges less than 30 m in length, over 30 m will be analyzed individually.

b. Design Loading should be H-15. H-10 acceptable under 50 ADT

c. Existing bridge width is considered to be at least pavement width.

(6) Vertical to horizontal

(7) CLEAR ZONE = Measured from edge of pavement/surfacing.

Iowa Department of Transportation

INSTRUCTIONAL MEMORANDUM
TO COUNTY ENGINEERS

TO	DATE
County Engineers	October 30, 1992
FROM	**IM No.**
Office of Local Systems	3.214

SUBJECT

3R GUIDELINES

It is apparent that available funding is insufficient to improve existing county roads to the geometric requirements desirable for new construction. County roads constructed to previous design criteria are still capable of performing a useful transportation service and in many cases minor improvements will make such roads serviceable for many more years.

The 3R Program has been initiated to preserve and extend the service life of an existing highway including the enhancement of safety. The three R's stand for Rehabilitation, Restoration, and Resurfacing; and may be categorized as:

REHABILITATION-- The traffic service improvement and safety needs may be of equal importance to the need to improve the riding quality. Projects may involve intersection reconstruction, pavement widening, pavement replacement, shoulder widening, flattening foreslopes, drainage improvement and improvement of isolated grades, curves or sight distance by reconstruction. Some additional right-of-way may be necessary.

RESTORATION-- This category is primarily for the major resurfacing or overlays which add a considerable amount of structure to the existing pavement. Usually resurfacings or overlays of a nominal four inches or more are included. In addition, some pavement widening, short sections of pavement reconstruction, shoulder widening, flattening foreslopes on high fills and intersection reconstruction may be involved. Consideration may be given to improving isolated grades, curves, or sight distance by construction or traffic control measures. In some cases minor ROW acquisitions or easements may be required.

RESURFACING-- Pavement resurfacing or overlays of less than a nominal four inches fall within this category. Other types of work such as pavement patching or short areas of reconstruction, joint replacement or repair, and shouldering may be included as part of the resurfacing project. Usually no additional right-of-way is required.

Projects falling into the 3R categories will be reviewed against the 3R Table included in this I.M.

Since Safety Enhancement is an essential consideration in any 3R project, the following items are to be considered:

1. All bridges and large culverts within the clear zone which are not presently shielded should be reviewed according to I.M. 3.213.

2. All signing and marking should be in conformance with the MUTCD.

3. The last 5-year accident history (ALAS) should be analyzed with respect to number, rate, location, type, and severity in order to identify any probable safety deficiencies which might be correctable as part of this project. A summary of the analysis should be sent in to the DOT with a copy of the ALAS printout.

4. U.A.C. of bridges narrower than pavement width must have prior approval as per I.M. 3.132. If approved, the guardrail should be erected, delineated with reflectors, and an edgeline extending 300' from all four corners should be painted. This is in addition to the narrow bridge signs.

5. Bridge rails and guardrails on existing bridges should be reviewed for structural adequacy. If found to be structurally inadequate and functionally obsolete such that it cannot adequately contain and redirect vehicles without snagging, penetrating or vaulting, it should be considered for upgrading. See I.M. 3.213.

6. All horizontal curves with recommended speeds less than the speed limit should be signed with curve or turn signs and advisory speed plates. Intersections or narrow bridges which exist within the stopping sight distance of a crest vertical curve should be signed accordingly.

7. Obstructions within the Clear Zone on 3R projects should be reviewed for removal, relocation, installation of a traffic barrier or do-nothing based on cost-effectiveness and safety considerations.

Each of these seven (7) items should be addressed in the project documentation submitted to the DOT.

October 1992

3R TABLE
FOR RURAL COLLECTORS

This table contains acceptable 3R values for existing Farm to Market Roads. Each project must be considered individually to determine what improvements are feasible to extend the useful life of the existing roads. Values below these shown on this table will be considered on a project-by-project basis, provided that each exception is justified to the Iowa DOT.

		RESURFACING			RESTORATION			REHABILITATION		
	ADT-Design Year	under 750	750 to 2000	over 2000	under 750	750 to 2000	over 2000	under 750	750 to 2000	over 2000
	DESIGN SPEED mph	Existing	Existing	Existing	40	40	40	40	40	40
	STOPPING SIGHT DISTANCE ft	Existing	Existing	225-250	275-325	275-325	275-325	275-325	275-325	275-325
(1)	MAXIMUM CURVATURE degrees	Existing	12.25	12.25	12.25	12.25	12.25	12.25	12.25	12.25
	MAXIMUM GRADIENT %	Existing	Existing	Existing	Existing	Existing	Existing	9	8	7
	PAVEMENT WIDTH ft	20	22	22	20	22	22	22	22	24
	SHOULDER WIDTH ft	2	3	6	2	3	6	2	3	6
	ROADWAY TOP WIDTH ft	24	28	34	24	28	34	26	28	36
	BRIDGE WIDTH EXISTING ft	20	22	22	22	24	26	22	24	28
	FORESLOPE ft	Existing	Existing	Existing	2:1	3:1	3:1	3:1	3:1	3:1
(2)	CLEAR ZONE ft	10	10	10	10	10	10	RDG (Max 30')	RDG (Max 30')	RDG

NOTES:

(1) a. Based on maximum e of .08.

b. Curves over 15mph below the posted speed should be delineated.

(2) a. RDG = Roadside Design Guide.

b. Rehabilitation projects, on routes with 2,000 ADT or less, should have a clear zone according to the RDG or 30' from the edge of the traveled way, whichever is less.

December 1993

INTERIM METRIC 3R TABLE
FOR RURAL COLLECTORS

This table contains acceptable 3R values for existing Farm to Market Roads. Each project must be considered individually to determine what improvements are feasible to extend the useful life of the existing roads. Values below these shown on this table will be considered on a project-by-project basis, provided that each exception is justified to the Iowa DOT.

	RESURFACING			RESTORATION			REHABILITATION		
ADT-Design Year	under 750	750 to 2000	over 2000	under 750	750 to 2000	over 2000	under 750	750 to 2000	over 2000
DESIGN SPEED km/h	Existing	Existing	Existing	60	60	60	60	60	60
STOPPING SIGHT DISTANCE m	Existing	Existing	80 - 90	80 - 90	80 - 90	80 - 90	80 - 90	80 - 90	80 - 90
(1) MINIMUM RADIUS m	Existing	125	125	125	125	125	125	125	125
MAXIMUM GRADIENT %	Existing	Existing	Existing	Existing	Existing	Existing	9	8	7
PAVEMENT WIDTH m	6.0	6.6	6.6	6.0	6.6	6.6	6.6	6.6	7.2
SHOULDER WIDTH m	0.6	1.0	1.8	0.6	1.0	1.8	0.6	1.0	1.8
ROADWAY TOP WIDTH m	7.2	8.6	10.2	7.2	8.6	10.2	7.8	8.6	10.8
BRIDGE WIDTH EXISTING m	6.0	6.6	6.6	6.6	7.2	8.0	6.6	7.2	8.6
(2) FORESLOPE m	Existing	Existing	Existing	1:2	1:3	1:3	1:3	1:3	1:3
(3) CLEAR ZONE m	3	3	3	3	3	3	RDG (Max 9)	RDG (Max 9)	RDG

NOTES:

(1) a. Based on maximum e of .08.

b. Curves over 25 km/h below the posted speed should be delineated.

(2) Vertical to horizontal

(3) a. RDG = Roadside Design Guide.

b. Rehabilitation projects, on routes with 2,000 ADT or less, should have a clear zone according to the RDG or 9 m from the edge of the traveled way, whichever is less.

Iowa Department of Transportation

INSTRUCTIONAL MEMORANDUM
TO COUNTY ENGINEERS

TO	DATE
County Engineers	December 11, 1997
FROM	**IM No.**
Office of Local Systems	3.216

SUBJECT

Economic Analysis (Benefit-to-Cost Ratio)

The purpose of this I.M. is to provide a mechanism to help determine the feasibility of an improvement or analyze various alternatives or countermeasures. Various methods (Cost-Effectiveness, Benefit/Cost Ratio, Rate-of-Return, Time of Return and Net Annual Benefit) are available to determine the economic feasibility of an improvement. This I.M. will present only one method, Benefit-to-Cost Ratio, for your consideration.

The Benefit/Cost Ratio is the ratio of the expected benefits accrued from an accident/severity reduction based on an improvement to the costs (construction, right of way, engineering, etc.) of the improvement. Included are two forms which may be utilized to determine the Benefit/Cost Ratio for a particular improvement that is being considered. One form will obtain the Benefit-to-Cost Ratio as it relates to the total project length (Rural Roadway Section). The other form is for spot locations, such as intersections, bridges, or curves within the project limits. The only difference in the forms is that the roadway section is based on 100 million vehicle miles (HMVM) whereas the spot location is based on million entering vehicles (MEV).

The information required to fill out the forms is as follows:

1. **ACCIDENT DATA:** This information can be obtained through ALAS by calling the Iowa DOT Bureau of Transportation Safety at 515-239-1668. For most county roads, with no major improvements within the time frame, the request should go back at least 5 years. If the traffic on a route is seasonal, such as to a park, then the ALAS data should be requested for whole years (no partial years) only. The accident data on the ALAS printout should be transferred to the appropriate blanks on the form, keeping in mind that the number of fatalities or injuries may not be the same number of these types of accidents (two injury accidents could involve five injuries). The actual property damage of all accidents should be totaled and entered in the appropriate blank. Use the value of $1,000 per accident, if no damage is recorded. All accidents within the project termini or at the spot location should be included, regardless of type. The accident severity reduction percentage is based on all accidents.

2. **IMPROVEMENT BEING CONSIDERED:** The improvement described and the cost estimate should only be for the work for which the Benefit/Cost Ratio is being determined.

   Example: If, as part of a resurfacing project, the county is considering widening the shoulders and flattening the foreslopes the description should be similar to:
   Widen shoulders from 2' to 6' and flatten slopes from 2:1 to 3:1.
   The cost estimate might include:
   - Class 10 Excavation, including borrow
   - Culvert Extensions
   - Surfacing or Finishing the Shoulders
   - Seeding and Fertilizing
   - Right of Way (if necessary), including any damages to fences, buildings, etc.
   - Additional Engineering or Surveying
   - Driveway Culverts (remove and relay or replace)

3. **SERVICE LIFE AND ACCIDENT/SEVERITY REDUCTION FACTORS:** Tables are included listing estimated values for these items for both roadway sections and spot locations.

   Accident/Severity reduction factors are usually provided for a single countermeasure. However, where multiple countermeasures are being proposed, the accident/severity reduction factor will be a combination of the individual accident/severity reduction factors. Since it is not feasible to reduce accidents by more than 100 percent, the following formula is used to develop an overall accident/severity reduction factor for multiple improvements at a location or along a route.

   $$AR_M = AR_1 + (1-AR_1)\ AR_2 + (1-AR_1)(1-AR_2)\ AR_3 + \ldots + (1-AR_1)(1-AR_{i-1})\ AR_i$$

   where: AR_M = overall accident/severity reduction factor for multiple improvements.

   AR_i = accident/severity reduction factor for specific improvement or countermeasure.

   i = number of improvements.

   Example

   An example of the use of the multiple improvement formula is shown for three improvements at a single location with individual accident/severity reduction factors of:

   $AR_1 = 0.45$
   $AR_2 = 0.30$
   $AR_3 = 0.15$

The overall accident/severity reduction factor is:

$$AR_M = AR_1 + (1-AR_1)\ AR_2 + (1-AR_1)\ (1-AR_2)\ AR_3$$
$$= 0.450 + (1-0.45)(0.30) + (1-0.45)(1-0.30)(0.15)$$
$$= 0.450 + 0.165 + 0.058$$
$$= 0.673 = 0.67$$

Most studies indicate that an improvement with a Benefit/Cost Ratio over 1.0 is considered beneficial and under 1.0 is not. However, when considering that estimated values are being utilized, a more in-depth review is in order for ratios from 0.80 to 1.20, inclusive. This review might include items listed on the Review page, in this I.M., as:

1. The accident rate determined in the forms should be reviewed against the statewide average for all secondary roads. The rate per 100 million vehicle miles in 1991 was 246.

2. Type of accidents should be reviewed against the type of improvement. If the majority of the accidents within the project termini occurred at intersections, then flattening foreslopes may not have much of an effect.

3. The severity of the accidents should be reviewed with respect to location. If most of the accidents along the route were PDO's and one location had a number of injury or fatality accidents then a review of that particular "spot" location may be in order.

4. The cost of the improvement being considered should be compared with the project cost without the improvement. If a proposed resurfacing project is estimated to cost $200,000 and the estimated cost to widen shoulders or flatten foreslopes is $500,000, it may be desirable to program the improvement at some future time. If the project is estimated at $750,000 and the improvement at $50,000, it may be wise to include the improvement.

5. The environmental or social effects of the improvement should always be considered. These might include: farmland being taken out of production; relocation of families; adverse effect on wetlands or parks; and disturbance of historical or archaeological areas.

6. In some cases other alternatives are available that may result in a similar benefit. If the reconstruction of a horizontal curve requires taking a farmstead or relocating a bridge, it may be more feasible to install chevrons and advisory speed plates.

These forms can be utilized as a tool in deciding whether an improvement is economically feasible. The completed Benefit/Cost Ratio sheet(s) should be attached, with copies of the ALAS printout, to the justification letter outlining the reasons for the county's request for any design exceptions. The Benefit/Cost Ratio should not be your only basis; other reasons that were considered in the decision should be detailed in the county's justification letter. See I.M. 3.218.

BENEFIT/COST RATIO REVIEW SHEET

1. **B/C Ratio = under 0.80**--Improvement probably not cost-effective at this time.
2. **B/C Ratio = 0.80 to 1.20**--Improvment may be cost-effective, should also consider:

    1. Accident rate compared to statewide average.
    2. Type of accidents vs. type of improvement.
    3. Severity of Accidents.
    4. Cost of improvement vs. project cost without improvement.
    5. Environment and social effects of improvement.
    6. Other alternatives to the improvement.
       (i.e. signing, pavement markings, etc.)

3. **B/C Ratio = over 1.20**--Improvement is probably cost-effective and should be accomplished as part of project or the work programmed in near the future.

BENEFIT/COST DETERMINATION COUNTY _____
(Rural Roadway Section)

Project No._____ Date_____

Location_____ Prepared by_____

Length(miles)_____ Current ADT_____

ACCIDENT DATA: From _____ to _____, Total # _____years
(date) (date)

Fatal Accidents _____ # Fatalities _____ x $800,000 = $_____

Injury Accidents _____ # Major Injuries _____ x $120,000 = $_____

Minor Injuries _____ x $ 8,000 = $ _____

Possible Injuries _____ x $ 2,000 = $ _____

PDO Accidents _____ Actual Prop. Dam. (Total) = $ _____
(Use $2,000/Acc. if none given)

(1) Total # Acc. _____ (2) Total Loss = $ _____

(3) Cost/Acc. = $\frac{(2)}{(1)}$ = Total Loss/Total # Acc. = $ _____/accident

(4) Acc. Rate = $\frac{\text{Total \# Acc. x 100,000,000}}{\text{ADT x Length x years x 365}}$ = _____ Acc./HMVM

DESIGN EXCEPTION BEING CONSIDERED:
Description of Improvement: (not project description)

(5) Estimated Cost Imp. $_____ (Thousand)

(5A) Estimated Service Life (E.S.L.) ____years

(5B) Estimated Overall Accident/Severity Reduction Factor _____ percent
See #3 page 2

B/C ANALYSIS:

(6) Estimated Traffic Volume =

$$\text{ADT} \times \frac{1+(1.02)^{(5A)}}{2} \times (5A) \times \text{Length} \times 0.00000365 = \_\_\_\_\_ \text{HMVM}$$

(7) Total Accident Loss = (3) x (4) x (6) =

Cost/ Acc. x Acc. Rate x Est. Traf. Vol. = _____ (thousand)

(8) Total Acc. Benefit = (7) x (5B) =

Tot. Acc. Loss x Est. % Acc. Reduction = _____ (thousand)

Benefit/Cost Ratio = $\frac{(8)}{(5)}$ = $\frac{\text{Tot. Acc. Benefit}}{\text{Est. Cost Imp.}}$ = _____

BENEFIT/COST DETERMINATION COUNTY_____
(Spot Location)

Project No._____ Date_____

Location_____ Prepared by_____

Length_____miles Current ADT_____

ACCIDENT DATA: From _____ (date) to _____ (date), Total # _____years

Fatal Accidents _____ # Fatalities _____ x $800,000 = $_____

Injury Accidents _____ # Major Injuries _____ x $120,000 = $_____

Minor Injuries _____ x $ 8,000 = $_____

Possible Injuries _____ x $ 2,000 = $_____

PDO Accidents _____ Actual Prop. Dam. (Total) = $_____
(Use $2,000/Acc. if none given)

(1) Total # Acc. _____ **(2)** Total Loss = $ _____

(3) Cost/Acc. = $\frac{(2)}{(1)}$ = Total Loss/Total # Acc. = $ _____/accident

(4) Acc. Rate = $\frac{\text{Total \# Acc. x 1,000,000}}{\text{ADT x years x 365}}$ = _____ Acc./MEV

DESIGN EXCEPTION BEING CONSIDERED:
Description of Improvement: (not project description)

(5) Estimated Cost Imp. $_____ (Thousand)

(5A) Estimated Service Life (E.S.L.) ____years

(5B) Estimated Overall Accident/Severity Reduction Factor_____percent
See #3 Page 2

B/C ANALYSIS:
(6) Estimated Traffic Volume =

$$\text{ADT} \times \frac{1+(1.02)^{(5A)}}{2} \times (5A) \times .000365 = \_\_\_\_\_ \text{ MEV}$$

(7) Total Accident Loss = **(3)** x **(4)** x **(6)** =

Cost/ Acc. x Acc. Rate x Est. Traf. Vol. = _____ (thousand)

(8) Total Acc. Benefit = **(7)** x **(5B)** =

Tot. Acc. Loss x Est. % Acc. Reduction = _____ (thousand)

Benefit/Cost Ratio = $\frac{(8)}{(5)} = \frac{\text{Tot. Acc. Benefit}}{\text{Est. Cost Imp.}}$ = _____

IMPROVEMENTS FOR RURAL ROADWAY SECTIONS

	Estimated Service Life (Years)	Estimated Accident/ Severity Reduction Factor (%)
Add Lane(s)	20	05
Widen Pavement	20	22
Widen Shoulder	20	08
Widen Pavement/Shoulder	20	28
Flatten Foreslopes	20	08
Widen Shoulder/Flatten Foreslopes	20	15
Friction Improvement		
Overlay	10	27
P. C. Grooving	10	14
Signing	6	05
Edgeline Markings	2	04
Horizontal Realignment	20	25
Vertical Realignment	20	30
Horizontal/Vertical Realignment/ Correct Superelevation	20	45
Roadway Lighting	15	06
Relocate Driveways	20	05
Flatten Entrance Slopes	20	05
Right of Way	100	--

IMPROVEMENTS FOR SPOT LOCATIONS

	Estimated Service Life (Years)	Estimated Accident/ Severity Reduction Factor (%)
Intersections:		
Channelize/Add Turning Lanes	15	25
Improve Sight Distance	15	35
Upgrade Signs/Markings	6/2	36
New Signs/Markings	6/2	83
Illuminate (not destination lighting)	15	20
Add Accel/Decel lane	20	25
Rumble Strips (Applies only to accidents involving stop condition)	A.C. 5 P.C. 10	44 44
Reconstruct Approach Angle	20	35
Add Beacons	10	25
Curves:		
Vertical Realignment	20	57
Horizontal Realignment	20	38
Horizontal/Vertical Realignment/ Correct Superelevation	20	73
Pavement Markings/Delineate	2/6	15
Bridges:		
Widen	20	48
Guardrail	15	24
Impact Attenuator	10	35
Replace	50	50
Eliminate	50	75

IMPROVEMENTS FOR SPOT LOCATIONS

	Estimated Service Life (Years)	Estimated Accident/ Severity Reduction Factor (%)
Culverts:		
Lengthen	20	48
Guardrail or Grate	15	24
Remove Headwall & Delineate	20	35
Railroad Crossing:		
Signalize	10	50
Upgrade Warning Devices	10	27
Illuminate	15	62
Replace with Grade Separation	50	39
Eliminate	50	75
High Fills:		
Guardrail	10	16
Delineate	6	10
Flatten Foreslopes	20	25

orm 740001
-92

Iowa Department of Transportation

INSTRUCTIONAL MEMORANDUM
TO COUNTY ENGINEERS

TO	DATE
County Engineers	October 30, 1992
FROM	IM No.
Office of Local Systems	3.218

SUBJECT

Design Exception Process

The purpose of this I.M. is to define the design exception process for use by the counties. After considering various factors for the type of roadway improvement, the proposed improvement may not meet one or more of the current design guides. If the County determines that a design exception is necessary, the proper justification must be submitted for approval to the Iowa DOT.

Step 1. DETERMINE TYPE OF IMPROVEMENT

Many factors are considered either directly or indirectly when determining the type of improvement. Some of those factors are:

A. PAVEMENT CONDITION--The existing pavement condition and the scope of needed pavement improvements dictate to a large extent, what improvements are practical. More significant geometric upgrading might be appropriate if the pavement improvements are substantial, but may not be appropriate or economical if the needed pavement improvements are relatively minor.

B. PHYSICAL CHARACTERISTICS--The physical characteristics of a highway and its general location often determine what improvements are desirable, practical or cost-effective. Topography, adjacent development, existing alignment (horizontal and vertical) and cross-section (pavement width, shoulder width, side slopes, etc.) need to be considered in determining the scope of geometric or safety improvements.

C. TRAFFIC VOLUMES--Traffic data (volume, percent trucks) are an important consideration both in the determination of the appropriate level of improvement (i.e., reconstruction vs. 3R) and in the selection of actual values for the various geometric elements.

D. FUNCTIONAL CLASSIFICATION--Drivers associate and expect certain geometric features and levels of design with each functional class.

E. TRAFFIC CONTROL AND REGULATIONS - Traffic regulations, positive guidance techniques (signs, markings) and traffic operational improvements can postpone costly reconstruction. These techniques can reduce or eliminate adverse safety and operational features of existing highways.

F. SAFETY ENHANCEMENT - Safety enhancement is an essential consideration for all proposed projects. Projects should be developed in a manner which considers appropriate safety improvements.

G. ACCIDENT RECORDS - Evaluation of accident records may reveal problems requiring special attention. It is an integral part of the project development process.

H. ECONOMICS - The economics of a project is a major factor in determining the priority and scope of work. This is especially true for 3R projects which prolong and preserve the service life of existing highways. 3R projects should protect the investment in and derive the maximum economic benefit from the existing highway system, and enhance safety where feasible.

I. POTENTIAL IMPACTS - Projects are influenced by potential impacts on the surrounding land and development. Social, environmental, and economic impacts may limit the scope of projects. This is especially true for 3R projects where the existing right of way is narrow and there is adjacent development.

J. OTHERS - Maximum benefit for the dollar invested, compatibility with adjacent sections of unimproved roadway, the probable time before reconstruction, and other items could be considered.

STEP 2. DETERMINE IF PROPOSED IMPROVEMENT MEETS CURRENT DESIGN CRITERIA.

If the proposed improvement does not meet the design criteria and the County wishes a design exception, continue to STEP 3.

STEP 3. ORDER OR PRINT ALAS DATA

If you do not have access to ALAS information via your computer, order the ALAS printout from Iowa DOT Bureau of Transportation Safety (515) 239-1668. This request should, at least, go back 5 years. Review the accidents on the ALAS printout with respect to location, type, severity, contributing circumstances, environmental conditions, and the time period. It is often helpful to plot the accidents on a map of the roadway by location, severity and type.

Roadway or environmental contributing circumstances should receive special attention. But, those accidents with driver or vehicle contributing circumstances should not be ignored. Even if an accident is the drivers fault (drunk, speeding, ran stop sign, etc.) you should look at possibly how the roadway environment (flatter slopes, stop ahead signs, etc.) may have lessened the severity of the accident.

Obtaining copies of accident reports on fatality accidents and the accidents involving a number of injuries or those classified as major injuries is helpful. These will provide you with additional information. You may want to review these with the County sheriff to get his/her perspective. It could be beneficial to field check the locations of these high severity accidents and any locations which appear to have a high number of accidents or a high accident rate.

STEP 4. PREPARE A COST ESTIMATE TO BRING DEFICIENCIES UP TO CURRENT GUIDELINES

This estimate does not need to be precise such as a complete redesign with exact quantities being determined. It can be based on the "average" conditions as in average right of way needed, average number of culverts extensions per mile, average cubic yards of dirt per mile and the average price of homes, buildings, wells, etc. It is suggested that this estimate be based on upgrading the deficiency to the current Design Aids; not to just the minimum to get by with this project.

STEP 5. CALCULATE BENEFIT TO COST RATIO ACCORDING TO I.M. 3.216

1. If the B/C is less than 0.80, then the B/C worksheet, ALAS printout, a letter stating the County's reasons for the exception (including a statement of whether there are any high accident locations), and the County's proposed mitigation is all that is needed.

2. If the B/C is from 0.80 to 1.20, then the six additional items listed on the review sheet in I.M. 3.216 need to be addressed in addition to the material listed previously.

3. If the B/C is over 1.20, then the exception may not be granted unless there are extenuating circumstances. One example of an extenuating circumstance may be that the severe accidents occurred at a certain location(s). The County proposes an improvement(s) at this location(s); and without these accidents the B/C is below 0.80. Another extenuating circumstance may be that the County doesn't have sufficient funds to do the improvement in conjunction with the project but will program it in the near future.

STEP 6. PREPARE COVER LETTER TO THE IOWA DOT REQUESTING THE EXCEPTION

Include in the letter the County's justification (reasons) and any proposed mitigation. The County may want to address some of the following items; where appropriate:

1. **Justification Portion:**

   A. **Pavement Condition**
   Example--The County has 100 miles of ACC pavement which requires resurfacing every 10 years to 15 years in order to maintain it. It is not feasible with present funding to reconstruct the roadway each time a resurfacing is needed. When the pavement requires more than a resurfacing, upgrading will be considered.

   B. **Physical Characteristics**
   Example--Although the foreslopes are 2:1, the ditch depths are less than 6' except for two locations. We will install guardrail at one location and the other is a short distance with no hazards on the slope or in the ditch.

   C. **Traffic Volumes**
   Example--Although the traffic volume is over 750 vpd along this 5 mile stretch, the north 3 miles is less than 750 and the south 2 miles near town is in a built up area with houses close to the road. Since it would be cost prohibitive to purchase or damage these homes, the County will request a speed study be conducted in this area.

   D. **Functional Classification**
   Example--This route carries, for the most part, local traffic between two communities and is not a through route in the county.

   E. **Traffic Control And Regulations**
   Example--The county installed chevrons at the two horizontal curves three years ago. The half mile north of the city is posted for 45 mph.

   F. **Safety Enhancement (Seven Items in I.M. 3.214)**
   Example--The bridge has had guardrail installed and the bridge rail, according to the factor system in I.M. 3.213, will be delineated. All signs and markings will be in conformance with the MUTCD. In checking the clear zone there is one culvert which will be guardrailed and although the power poles between Stations 100+00 and 120+00 are within the clear zone they are located as close to the right of way line as is practical.

G. **Accident Records**
Example--There are no areas with a concentration of accidents and the accident rate is below the statewide average. The one fatality accident that occurred on this route was a head-on collision near Station 110+50 which is a flat stretch and the vehicles remained on the roadway after the accident. Therefore, the vertical curves and the 2:1 slopes did not enter into this accident and if this accident is not considered in the B/C calculations, the B/C ratio is less than 0.80.

H. **Economics**
Example--To reconstruct the 15° horizontal curve will require either the purchase of a $120,000 house or the reconstruction and relocation of a 24' X 120' bridge. We plan to reconstruct the curve at the time the bridge is replaced in five to ten years. Until then, curve sign with advisory speed plates and chevrons, will be installed along with the painting of edgelines.

I. **Potential Impact**
Example--The crest vertical curve in question has a cemetery on one side and a church on the other side of the road. There have been no accidents at this location. The cemetery entrance is located at the top of the crest with plenty of sight distance and the church entrance will be relocated directly across from the cemetery entrance. The "no passing zone" will be painted according to the MUTCD.

2. **Mitigation:**

A. **Horizontal Curves**
Examples
- Curve signs or Turn signs
- Advisory speed plates
- Chevrons
- Edgelines

B. **Vertical Curves**
Examples
- No passing zone pennants
- No passing lines at height of eye per MUTCD
- Edgelines
- Relocate entrances or advance crossing signs (W11 series)
- Relocated road intersections with limited sight distance or place crossroad sign (W2-1) or side road sign (W2-2), possible with advisory speed plates
- Animal signs (W11-3 & 4) with a history of animal accidents

C. **Shoulders**
Examples
- Edgelines

D. **Slopes**
Examples
- Edgelines
- Flatten slopes with ditch depths over 6' or a traffic barrier (w-beam or cable guardrail)
- Flatten driveway slopes

E. **Grades**
Examples • Hill signs (W7-1), if needed, as determined by percent of grade and length

F. **Narrow Bridges**
Examples
- Guardrail
- Bridge rail upgrading
- Narrow bridge signs (W5-2)
- Delineation
- Edgelines
- Object markers

G. **Clear Zone**
Examples
- Remove hazards
- Traffic barriers
- Relocate utilities as close to right of way line as possible

H. **Combinations**
Examples
- Speed study if a high accident rate
- Traffic barriers
- Spot reconstruction

STEP 7. SEND 2 COPIES OF THE FOLLOWING TO THE IOWA DOT DISTRICT OFFICE:

1. Cover letter stating the exception(s)
2. Analysis of the accident history with ALAS printout
3. B/C ratio
4. County's reason(s) for the exception(s)
5. County's proposed mitigation(s)
6. Copies of all documentation (ALAS printout, B/C worksheet, Bridge rail sheet, etc.)

STEP 8. APPROVAL/DISAPPROVAL BY THE IOWA DOT

The District Local Systems Engineer will review the exception, recommend approval or disapproval and forward the items in Step 7 to the Office of Local Systems. The Iowa DOT Secondary Roads Engineer will make the final approval or disapproval. He/she will notify the District Local Systems Engineer with a copy to the County.

6 CONCEPT STATEMENT FOR FEDERAL-AID PROJECTS

CULTURAL RESOURCE REGULATIONS AND LOCAL GOVERNMENT PROJECTS

Date: _____

IOWA DEPARTMENT OF TRANSPORTATION

Concept Statement for Local Systems Federal-Aid Projects

Submit To: Transportation Center Local Systems Engineer (4 copies)

Concept Statement for Federal-Aid Project in: County: _____ City: _____

Project Number (if known): _____ STIP Year: _____

Contact Person: _____ Target Letting: _____

Address: _____ Phone No. _____

1. Federal-Aid Project Location(s) (include street name(s) and termini) Attach a detailed location map.

_____

_____

2. Project Type — x appropriate box(es):

☐ ACC Paving ☐ ACC Resurfacing ☐ ACC Widening

☐ Bridge Replacement ☐ Bridge Rehabilitation ☐ Grading ☐ Intersection Modifications

☐ Lighting ☐ Patching ☐ PCC Paving ☐ PCC Widening ☐ RCB Culvert ☐ Traffic Signals

☐ Enhancement: _____ (Type: trail, scenic, historic) ☐ Other: _____ (Describe)

3. Federal-aid Project Length: _____ (miles or kilometers to nearest tenth)

4. Existing Structure: FHWA Structure No. _____ Structure Type: _____

Structure Size: _____ Year Built: _____

5. Estimated Project Cost: $ _____ Total Federal-Aid (STIP): $ _____

6. Will the Local Public Agency/Applicant be requesting Federal-aid in eligible:

a) Land or property acquisition (ROW) costs? ☐ Yes ☐ No

b) Preliminary engineering (PE) costs? ☐ Yes ☐ No

c) Construction engineering (CE) costs? ☐ Yes ☐ No

7. Estimate of Right of Way Needs (anticipated land or property acquisition impacts)

Will the proposed project: Answer all six questions.

Yes	No		Yes	No	
☐	☐	Require temporary construction easement(s)?	☐	☐	Require total property acquisition(s)?
☐	☐	Require permanent easement(s) or fee title?	☐	☐	Involve relocation assistance for displaced person(s) and/or businesses?
☐	☐	Require borrow material? (If so, see 9a.)	☐	☐	Involve a change in property access which results in damages to the remainder parcel?

8. Public Acceptance

Is it anticipated that the proposed project will receive a substantial degree of public opposition? ☐ Yes ☐ No

9. **Environmental Impacts to the Proposed Project**

Will the proposed project: **Answer all questions.**

Yes	No	
☐	☐	a. Involve land which has not been disturbed by previous construction activities either public or private? (Farming activities are not necessarily a disturbance.)

If so, how much additional right of way width or new land will be acquired? _____

(Photos of area would be beneficial.)

Have you contracted for an archaeological survey? ☐ Yes ☐ No

If complete, SHPO approval date: _____ (attach letter)

☐	☐	b. Involve property acquisition with a house, building or structure more than 50 years old?

If so, has a historical survey been completed? ☐ Yes ☐ No

If complete, SHPO approval date: _____ (attach letter)

☐	☐	c. Be in the proximity of known historical or archaeological sites of national, state or local significance? (Attach list of all known sites or historic districts adjacent to or within the project limits.)

If so, submit details of potential construction impacts.

Do the existing streets to be improved using Federal funds contain brick pavers? ☐ Yes ☐ No

☐	☐	d. Involve the acquisition or use of property from a publicly owned park, recreational area, playground, nature trail, historic site, greenbelt, wildlife refuge or other Section 4(f) land?

If so, describe: _____

(Requires Section 4(f) statement to be approved by FHWA; contact Office of Project Planning, Iowa DOT.)

Were Land and Water Conservation Act funds used to acquire or improve the property? ☐ Yes ☐ No

If yes, this constitutes Section 6(f) involvement. Contact the federal grants coordinator at IDNR to explain the proposed project and receive guidance on how to obtain authorization for conversion of land to transportation use.

☐	☐	e. Affect wetlands as defined in Technical Guidelines from the U.S. Army Corps of Engineers Wetlands Delineation Manual, 1987?

If yes, refer to Instructional Memorandum (IM) 3.131.

☐	☐	f. Affect a floodplain or floodway as defined in 567-70.2 & 71 of the Iowa Administrative Code?

If yes, refer to IM 3.131.

☐	☐	g. Involve the acquisition of more than 5 acres of farmland in any one mile (or less) length of the project?

(If so, requires submittal of Form AD-1006, "Farmland Conversion Impact Rating.")

☐	☐	h. Be in the proximity of known threatened or endangered species habitat as identified under the Federal Endangered Species Act or as identified on the State Protected Species List?

If so, what species? _____

(For additional information, contact the County Conservation Board.)

☐	☐	i. Involve the clean-up of a known hazardous waste site?

(Includes sites contaminated by leaking underground storage tanks, structures with asbestos, etc. For additional information, contact the IDNR.)

☐	☐	j. Have probable significant noise, air quality or water quality impacts to raise public concern and warrant special mitigative measures?

10. **Physical Features of the Proposed Project**

Will the proposed project:

☐	☐	Be within 20,000 feet of an airport? (Refer to IM 3.15.)
☐	☐	Have a railroad crossing or railroad signals within its limits? (If so, contact the railroad company to obtain an agreement or temporary construction easement.)

11. Project Design Elements — **City**

Refer to the Urban Design Tables when completing the design elements below.
Complete a separate table for each street to be improved.
Complete only those sections applicable to the project being proposed.

Features	Proposed Design
Street Name	
Federal Functional Classification	☐ Principal Arterial ☐ Minor Arterial ☐ Collector
Type of Area	☐ Commercial ☐ Fringe ☐ Rural
Speeds	Posted Speed _____ mph or kph Design Speed _____ mph or kph
Existing Traffic Volumes (if available) (year)_____ AADT _____ vpd	(year) _____ AADT _____ vpd Percent Trucks _____ %
Number of Traffic Lanes	
Total Roadway Width (Back-of-Curb to Back-of-Curb or Edge of Slab to Edge of Slab).	
Travel Lane Widths	
Curb & Gutter Widths — Urban Sections or Shoulder Widths — Rural Sections Foreslope Ratios — Rural Sections	
On-Street Parking Lane Widths (Curb width may be included as part of the Parking Lane Width.)	
Median Widths/Type (raised, etc.)	
Border Area Widths (Border area is the area between the roadway and the ROW line.)	Left _____ Right _____
Horizontal Clearance (Clear Zone)	
Bridge (curb to curb width) or RCB Culvert (approximate size)	
Traffic Signal Locations Do they meet Signal Warrants? (Refer to Section 4C of MUTCD.)	Warrant Number(s) Met: _____

Does the City or their Consultant desire to have the Office of Local Systems provide design traffic forecast data?

☐ Yes ☐ No

11. **Project Design Elements — County**

Refer to the appropriate Design Tables (I.M. 3.210 or 3.214) when completing the design elements below. Complete a separate table for each project division.

Functional Classification: _____ **(Major Collector, Minor Collector, Local)**

AADT: Present _____ **Future** _____ **Design Year** _____

1.	Terrain is ☐ Flat ☐ Rolling ☐ Hilly		
2.	Proposed Design Speed _____ mph or kph (circle one)		
		Present	**Proposed**
3.	Maximum Gradient		
4.	Roadway Surface Type		
5.	Surfaced Roadway Width		
	Shoulder Width (one side)		
	Shoulder to Shoulder Width (Roadway Top Width)		
	Shoulder Type		
6.	Bridge Widths (all bridges)		
	Is guardrail present? ☐ Yes ☐ No		
	Is guardrail proposed? ☐ Yes ☐ No		
	Will channel change be required? ☐ Yes ☐ No		
7.	Foreslope Ratio		
8.	Clear Zone will be met ☐ Yes ☐ No		
9.	Design Exceptions ☐ Yes ☐ No (If yes, explain and attach justification.)		

ENVIRONMENTAL CONCURRENCE PROCESS ISSUES

1. Maps - inadequate or none included - FHWA has requested a project location map be included with each CE submittal.

2. Accurate and complete project descriptions, including revisions/updates to project concept statements. If project will be staged or if multi-phase an overview of entire project is beneficial.

3. Plans with proposed ROW shown or maps with ROW locations and needs shown. (Photographs are sometimes helpful in determining the need for archaeological survey.)

4. On any federal aid project that has ROW, the applicant must be told initially that cultural resource requirements have to be assessed.

5. Appropriate information regarding a historic bridge must be provided.

6. Copies of archaeological and historic reports (if the project concept statement says a report was done a copy should be attached to the concept statement).

7. Copies of correspondence with SHPO, Corps of Engineers, etc.

8. Identify wetland and park land issues.

State Historical Society of Iowa

The Historical Division of the Department of Cultural Affairs

Basic 106 Information required for ISTEA Projects

- Is land acquisition involved?
- Has project area been surveyed?
- Has project area been evaluated?
- Does project include any excavation? What kind?
- Does project include any fill to be used? From where?
- Include photographs of structure, interior and exterior
- Describe project area as currently exists and include proposed changes.

☐ 402 Iowa Avenue
Iowa City, Iowa 52240-1806
(319) 335-3916

☐ 600 E. Locust
Des Moines, Iowa 50319-0290
(515) 281-6412

☐ Montauk
Box 372
Clermont, Iowa 52135-0372
(319) 423-7173

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request
Name Of Project	Federal Agency Involved
Proposed Land Use	County And State

PART II *(To be completed by SCS)*		Date Request Received By SCS	
Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply — do not complete additional parts of this form).*	Yes ☐ No ☐	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount Of Farmland As Defined in FPPA Acres: %	
Name Of Land Evaluation System Used	Name Of Local Site Assessment System	Date Land Evaluation Returned By SCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site				
PART IV *(To be completed by SCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by SCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160				
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100				
Total Site Assessment *(From Part VI above or a local site assessment)*	160				
TOTAL POINTS *(Total of above 2 lines)*	260				

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 – Federal agencies involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form.

Step 2 – Originator will send copies A, B and C together with maps indicating locations of site(s), to the Soil Conservation Service (SCS) local field office and retain copy D for their files. (Note: SCS has a field office in most counties in the U.S. The field office is usually located in the county seat. A list of field office locations are available from the SCS State Conservationist in each state).

Step 3 – SCS will, within 45 calendar days after receipt of form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland.

Step 4 – In cases where farmland covered by the FPPA will be converted by the proposed project, SCS field offices will complete Parts II, IV and V of the form.

Step 5 – SCS will return copy A and B of the form to the Federal agency involved in the project. (Copy C will be retained for SCS records).

Step 6 – The Federal agency involved in the proposed project will complete Parts VI and VII of the form.

Step 7 – The Federal agency involved in the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA and the agency's internal policies.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

Part I: In completing the "County And State" questions list all the local governments that are responsible for local land controls where site(s) are to be evaluated.

Part III: In completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them.

2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities) that will cause a direct conversion.

Part VI: Do not complete Part VI if a local site assessment is used.

Assign the maximum points for each site assessment criterion as shown in §658.5(b) of CFR. In cases of corridor-type projects such as transportation, powerline and flood control, criteria #5 and #6 will not apply and will be weighed zero, however, criterion #8 will be weighed a maximum of 25 points, and criterion #11 a maximum of 25 points.

Individual Federal agencies at the national level, may assign relative weights among the 12 site assessment criteria other than those shown in the FPPA rule. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total weight points at 160.

In rating alternative sites, Federal agencies shall consider each of the criteria and assign points within the limits established in the FPPA rule. Sites most suitable for protection under these criteria will receive the highest total scores, and sites least suitable, the lowest scores.

Part VII: In computing the "Total Site Assessment Points", where a State or local site assessment is used and the total maximum number of points is other than 160, adjust the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points; and alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site "A."}$$

Iowa DOT/Federal Highway Administration
SCS Coordination as Required by the
Farmland Protection Policy Act

Date: _____ Iowa DOT Ref. No. _____

Project Description _____

_____

As indicated in the "Supplemental Guidance for Implementation of Farmland Protection Act" provided by the Iowa Division Administrator, FHWA, on February 14, 1985:

> Form AD-1006 need not be submitted to the SCS in cases where the site assessment criteria (Part VI) score is less than 60 points for each project alternative [based on 7 CFR 658.4(c)(2)]... The SCS agrees that where all project alternatives are scored less than 160 points there is little or no benefit to be derived from submitting Form AD-1006 to its field offices for coordination. To document compliance with the SCS regulation, the state highway agency need only complete Parts I, III, V (assign 100 points), and VI and place the completed form in the project files.

Form AD-1006 has been completed as described above and is attached. Total impact rating points are shown to be less than 160 indicating that this site should receive a minimal level of consideration for protection. Based on this analysis this project is expected to have a very minor affect on Iowa's farmland and does not require specific SCS review. This documents compliance with the Farmland Protection Policy Act as it applies to above referenced project.

Criteria for Assessing Prime Farmland Impacts

Source: Federal Register, Vol. 49, No. 130 (July 5, 1984); 7CFR 658.5(b)

658.5(b) Site Assessment Criteria. Federal agencies are to use the following criteria to assess the suitability of each proposed site or design alternative for protection as farmland along with the score from the land evaluation criterion described in 858.5(a). Each criterion will be given a score on a scale of 1 to the maximum points shown. Conditions suggesting top, intermediate and bottom scores are indicated for each criterion. The agency would make scoring decisions in the context of each proposed site or alternative action by examining the site, the surrounding area, and the programs and policies of the state or local unit of government in which the site is located. Where one given location has more than one design alternative, each design should be considered as an alternative site. The site assessment criteria are:

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?

More then 90 percent--15 points

90 to 20 percent--14 to 1 point(s)

Less than 20 percent--0 points

% Pts
90-14
80-12
70-11
60-9
50-7
40-5
20-2
20-1

(2) How much of the perimeter of the site borders on land in farming ~~nonurban~~ use?

More then 90 percent--10 points

90 to 20 percent--9 to 1 point(s)

Less than 20 percent--0 points

% Pts
90-9
80-8
70-7
60-6
50-5
40-4
30-3
20-1

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?

More then 90 percent--20 points

90 to 20 percent--19 to 1 point(s)

Less than 20 percent--0 points

90 - 19
80 - 16
70 - 14
60 - 11
50 - 9
40 - 6
30 - 4
20 - 1

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland? County Land Use Plan?

Site is protected--20 points

Site is not protected--0 points

~~(5)~~ Criteria 5 not considered for projects having a linear or corridor-type site configuration connecting two distant points, and crossing several different tracts of land (i.e., highways).

Assign Zero Points

~~(6)~~ Criteria 6 not considered for projects having a linear or corridor-type site configuration connecting two distant points, and crossing several different tracts of land (i.e., highways).

(7) Is the farm unit(s) containing the site (before the project) as large as the average-size farming unit in the county? (Average farm sizes in each county are available from the SCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage of Farm Units in Operation with $1,000 or more in sales).

As large or larger--10 points

Below average--deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average--9 to 0 points

Pts
10
9
8
7
6
5
4
3
2
1
0

(8) If this site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?

Acreage equal to more than 25 percent of acres directly converted by the project--25 points

Acreage equal to between 25 and 5 percent of the acres directly converted by the project--24 to 1 point(s)

Acreage equal to less than 5 percent of the acres directly converted by the project--0 points

(9) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?

All required services are available--5 points

Some required services are available--4 to 1 point(s)

No required services are available--0 points

(10) Does the site have substantial and well-maintained on-farm investments such as barns, other storage buildings, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?

High amount of on-farm investment--20 points

Moderate amount of on-farm investment--19 to 1 point(s)

No on-farm investment--0 points

(11) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as

to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?

Substantial reduction in demand for support services if the site is converted--25 points

Almost always zero.

Some reduction in demand for support services if the site is converted--24 to 1 point(s)

No significant reduction in demand for support services if the site is converted--0 points

(12) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?

Proposed project is incompatible with existing agricultural use of surrounding farmland--10 points

Almost always zero.

Proposed project is tolerable to existing agricultural use of surrounding farmland--9 to 1 point(s)

Proposed project is fully compatible with existing agricultural use of surrounding farmland--0 points

Iowa Department of Transportation

INSTRUCTIONAL MEMORANDUMS
To County Engineers

To	Date
Iowa County Engineers	September 1997
From	**IM No.**
The Office of Local Systems	3.131

Subject

Design and Submittal of Preliminary Bridge and Culvert Plans

TABLE OF CONTENTS

PRELIMINARY BRIDGE AND CULVERT PLANS

INTRODUCTION

This portion of the Instructional Memorandum is intended to provide the County and City Engineering staff with guidelines for designing, submitting and obtaining IDOT approval of Preliminary Bridge and Culvert plans, including hydraulics and the preliminary Situation Plans of proposed structures.

Major sections in IM 3.131 include:

- Submittal Information
- Design Guidelines
- Completing the Preliminary Bridge Plan
- Floodplain and Environmental Permits
- Summary
- Submittal Checklist

Numerous appendices are attached to assist in the design and submittal of these plans.

Significant changes to 3.131 from the December 1992 edition include the following:

- Rewritten and reorganized so that the document is easier to use.
- Update of 404 Permit procedures and new wetlands regulations in Appendix A
- An update to DNR rules in Appendix C, especially to the list of "Protected Streams" in rule 72.50. This rule primarily affects channel changes.
- More guidance for soils design is provided in Appendix G.

SUBMITTAL INFORMATION

Preliminary bridge and culvert plans will be submitted through the Transportation Center Local Systems Engineer. A submittal checklist for preliminary bridge and culvert plans is given on page 14. Submit your preliminary plans at an early date. Do not wait until the final structural design plans are completed. It will allow the Office of Bridges and Structures adequate time to make constructive comments without costing you design time.

Preliminary bridge plans must be accompanied by the following information:

1. Hydraulic calculations (see below)
2. Completed Form 1-E (see below and Appendix F)
3. Risk Assessment Form (see below and Appendix F)
4. Site photos (see below)
5. Road profile gradeline (see below)

Photographs

Photographs of the valley section and bridge site are quite helpful and should include the following views:

1. looking upstream
2. looking downstream
3. looking across the downstream valley
4. looking at present bridge opening (include enough detail to identify the bridge type)
5. looking at the bridge from roadway surface

This will provide a complete view of the crossing. You must furnish these photos with each preliminary design submittal for bridge replacements. The photo showing the structure opening and the one showing the bridge from the roadway will be sent to the Office of Project Planning for their use in historic evaluation of the project. All other photos will be returned to you if requested.

Roadway Geometrics

The County or City Engineer must submit adequate data about the roadway geometrics to the Transportation Center Local Systems Engineer who will review to determine if the structure is compatible with the existing roadway and/or any proposed roadway improvements. This roadway information is also used in the hydraulic review to analyze potential road overtopping. It is helpful to have both existing and proposed road grades shown on the plans. Refer to current design guides in IM 3.210.

DESIGN GUIDELINES

Introduction

This section discusses various guidelines needed for the preliminary design of various structures. Topics discussed in this section are as follows:

Hydrology
Minimum Bridge Length
Selection of Design Flood and Clearances for Stream Crossings
Risks of Road Overtopping
Effect of Adjacent Roads on Design Flood Selection
DNR Requirements for Backwater and Freeboard
Bridge Submergence
Wing Dikes
Sizing Culverts
Tapered Inlet Culverts
Low Water Stream Crossings
Hydraulic Literature and Software

Hydrology

The Iowa Runoff Chart (1000 acres or less) and USGS Report Number 87-4132 (1000 acres or more) are used to determine the design discharges in **rural watersheds**. (See Appendix L for a copy of the Runoff Chart.) If there is a USGS gaging station near your site, call the USGS for the gage information to use in your hydraulic and hydrologic design.

Do **not** use INRC's Bulletin No. 11 (1973) for determining discharges. This publication is outdated and has been superceded by USGS Report Number 87-4132 described above. When using 87-4132, be careful to use the appropriate "Region". **Make sure the topography at your bridge site is appropriate for the "Region" you select to determine the discharge.**

If there is a Flood Insurance Study at your site, contact DNR to make sure that you are using the correct design and discharge information. See Appendix B for a list of these studies. The USGS and the Corps of Engineers have published reports on many of the larger rivers. See Appendix E for a list. These reports contain actual or calculated flood discharges and flood profiles, and they are very useful in designing a river crossing.

See Appendix L for a chart to use in estimating Q_{500}.

Selection of Design Flood and Clearances for Stream Crossings

A stream crossing consists of both the bridge and the roadway approaches. Stream crossings on high traffic volume or emergency access roads should generally be designed to a higher criteria such as a 50-year design flood. Where practical, clearance below the low superstructure should be three feet above design high water or one foot clearance above extreme high water, whichever is greater. The approach roadways should generally be one foot above design high water. Some "extreme high water" elevations can be disregarded in setting the grade if they are so high as to be impractical to design for.

The following table is provided for guidance primarily for rural county roads. The further you reduce your design flood frequency (e.g. from a 50-year to a 10-year flood), the lower the quality of service. The table lists minimums. Use the highest discharge that you feel you can justify.

DESIGN FLOOD GUIDELINES

Project ADT	Frequency of Design Flood	Clearance (1)			
		Bridge (2)		Approach Roadway (3)	
		Large (4) Streams	Other Streams	Large Streams	Other Streams
Land Access Roads	2± year	3' above Q_{50}	2' above Q_2	1' above Q_2	1' above Q_2
49	5± year	3' above Q_{50}	2' above Q_5	1' above Q_5	1' above Q_5
50 - 99	10± year	3' above Q_{50}	2' above Q_{10}	1' above Q_{10}	1' above Q_{10}
100 - 399	25± year	3' above Q_{50}	3' above Q_{25}	1' above Q_{25}	1' above Q_{25}
400	50± year	3' above Q_{50}	3' above Q_{50}	1' above Q_{50}	1' above Q_{50}

Notes:
(1) Clearances may be adjusted in some cases. See discussion below.
(2) Bridge clearance is determined by natural flood elevation, not backwater elevation. Also known as "freeboard".
(3) Approach roadway clearance will be determined using the bridge backwater elevation.
(4) DNR requirements. See page 6.

Clearance guidelines could be relaxed in those instances where it is impractical to provide recommended clearance because of unreasonably high cost. For example, costs may be high if a grade raise would result in the replacement of a large amount of present pavement. Also, costs may be high if the bridge is in a developed area with commercial or residential property. These examples should be handled individually as special cases. Clearance guidelines may also be relaxed where the stream is not expected to carry significant amounts of ice or debris, such as on most smaller streams.

Risks of Road Overtopping

The Engineer should be aware of the risks involved when setting road grades. If the grade is set extremely high so that even a very rare flood such as a Q_{500} will not overtop, then the "relief valve" for the bridge is eliminated. In this instance, the bridge opening is forced to withstand the entire flood and is at risk of damage or failure. On the other hand, if the road grade is set very low, it will be

overtopped frequently. Both instances may result in potential hazards to the traveling public and may also result in significant damage to the road. Sound engineering judgment is needed when setting the road grade. Consideration should be given to factors such as debris and ice potential, traffic counts, construction costs, maintenance costs, size of stream (i.e. flash flood potential), and DNR requirements.

Effect of Adjacent Roads on Design Flood Selection

If another bridge on the same stream is nearby (i.e. just upstream or downstream) and is designed to a high level of overtopping, this may affect the selection of design flood. For example, if another road one mile upstream overtops only during a 50-year or greater flood, and if traffic can easily use this other road during a lesser flood, then the Engineer may give consideration to using a smaller design flood.

DNR Requirements for Backwater and Freeboard

All bridges with a 100 square mile drainage area or greater in an unincorporated area and two square miles or greater in an incorporated area need a DNR permit and must be designed as required by DNR. All stream crossings (bridges and approaches) that are submitted to DNR should be designed so that they develop less than 0.75' of backwater for 50-year or lesser floods and less than 1.5 feet for a 100-year flood when the upstream land use is "low damage potential" (see Appendix C). The bridge must have 3 feet of freeboard above the 50-year flood. DNR may grant a variance from the backwater or from the freeboard requirements **if** it is adequately justified in your DNR submittal. Contact DNR if you have one of these cases. See the section in this IM entitled "Floodplain and Environmental Permits" and Appendix C for more discussion on DNR permit requirements.

There may also be requirements for a local Flood Insurance Study. DNR oversees the National Flood Insurance Program in Iowa so contact them for specific requirements. See section "Floodplain and Environmental Permits" and Appendix B for further information.

Minimum Bridge Length

Generally, the bridge should not encroach on the natural channel width. In other words, the high abutments or the abutment berms should not project into the channel, thus making the bridge opening smaller than the natural channel. This is considered the minimum length structure, even if hydraulic calculations indicate low velocities. The bridge may need to be longer than this minimum length if the hydraulic analysis reveals that velocities through the bridge opening are excessive or are significantly higher than velocities in the natural channel during design discharge.

Even if road grade overflow is allowed, the minimum bridge length will generally be a bridge long enough to span the main channel. Bridges shorter than the main channel width may require more maintenance due to inadequate waterway opening and increased velocities.

Bridge Submergence

If a bridge will be submerged in the design flood, lateral and buoyant forces against the structure must be considered during structural design. If the beams will be submerged at design high water, consider placing "vent holes" in the steel or prestressed concrete girders to reduce buoyant forces.

Wing Dikes

Use wing dikes on all bridges with significant overbank flows. It is much better to have the end of a wing dike erode away than have the bridge berm damaged. See Appendix I for wing dike details.

Sizing Culverts

Culverts in Iowa are usually sized by allowing approximately one foot of head above the top of the opening during the design flood. This typically results in a HW/D (Head water over depth) ratio of between 1.1 and 1.4, depending on the size of culvert. Culvert outlet velocities can be high (e.g., 16 feet per second) and still be tolerable, since the maximum flow velocity at the outlet of a culvert usually lasts only about as long as the storm lasts. Since culverts generally have small drainage areas, the duration of significant runoff is short, a few hours at the most. The root systems of the vegetative cover at the culvert outlet can withstand short durations of high velocities. The root system then gets time to heal itself before the next major storm occurs.

If the velocities cannot be handled by the vegetative cover, riprap or some form of energy dissipators can be used. Site experience is valuable to determine this need.

The hydrology for rural watersheds draining less than 1000 acres should be developed using the Iowa Runoff Chart (Appendix L). If the drainage area is greater than 1000 acres, use USGS Report 87-4132.

Tapered Inlet Culverts

Considerable savings may be achieved by using tapered inlets (improved inlets) on box culverts. Tapered inlets may be used any time there is a reasonable elevation difference (at least 5' to 10') between the inlet and outlet ground elevations. Many times this elevation difference can be achieved by raising the inlet and giving the upstream land owner a valuable permanent pond as a part of the project.

IDOT's practice is to taper the inlet width (not the height) while dropping the flowline to obtain the necessary velocity to make the taper function properly. This means that the inlet section is a "wide" culvert and is tapered to a "normal" culvert. As a rule of thumb, keep the flowline of the outlet barrel at least 1/2 of the barrel height (0.5 x D) above the streambed. This prevents the tailwater from "drowning out" the outlet which would force the culvert into outlet control. A flume is then used as an energy dissipator. The flume basin is normally set 4' to 6' below the outlet stream bed elevation.

The Iowa method for the hydraulic design of tapered inlets is in Appendix K. The FHWA method for design is outlined in their publication Hydraulic Design of Highway Culverts, HDS No. 5. Both methods give similar results.

Low Water Stream Crossings

Low water stream crossings (fords, vented fords, and low bridges) will be reviewed on an individual basis. IDOT does not have a policy on these types of crossings and therefore only reviews the hydraulic characteristics and does not approve or disapprove the plan. See IM 2.23 for guidance on signing these crossings.

Iowa State University, in conjunction with IDOT and the Iowa Highway Research Board, has published two documents that may be helpful when considering a low water stream crossing:

Design Manual for Low Water Stream Crossings , HR-247, October 1983.
Liability and Traffic Control Considerations for Low Water Stream Crossings, HR-218, April 1981.

Hydraulic Literature and Software

All County and City Engineering offices should have at least one copy of each of these FHWA publications:

Hydraulics of Bridge Waterways, HDS No. 1
Design Charts for Open Channel Flow, HDS No. 3
Design of Roadside Drainage Channels, HDS No. 4
Hydraulic Design of Highway Culverts, HDS No. 5

Appendix J contains a list of available FHWA hydraulic publications and tells how to obtain them.

In addition, each office should have a copy of IDOT's PCVAL software to use in the development of stage-discharge information. See Appendix M for instructions.

WSPRO, used for calculating bridge backwater and water surface profiles, may be obtained from McTRANS. Also available from McTRANS is a package of hydraulic and hydrologic software called HYDRAIN. This package contains WSPRO, a culvert design program called HYCLV, and a few other programs. HYDRAIN is fairly user-friendly and is reasonably priced. A phone number for McTRANS is in Appendix J.

Soils

Soils and foundations are obviously an important part of any structure. See Appendix G for information and recommendations in obtaining useful and accurate soil borings, and selecting appropriate pile types and foundation layers.

COMPLETING THE PRELIMINARY BRIDGE PLAN

On page 11 you will find a sample preliminary bridge plan. The development of this plan is discussed below.

1. Title Block - This contains most of the essential information about the bridge, i.e., type and size of bridge, type of abutments, type of piers, skew angle, station, file number, project number, and design number. The title block should be placed in the lower right corner of the plan sheet so that it is readable on the folded plan.

2. Location - Give complete location information. Place it near the title block so it can be read on a folded plan.

3. North Arrow

4. Hydraulics and Hydrology - The following table should be included on all bridge plans submitted to IDOT for approval.

HYDRAULIC DATA

Drainage Area	_____ sq mi		
Stream Slope	_____ ft/mi		
Bridge Waterway Area	_____ sq ft		
Design Velocity	_____ ft/s		
Q_{50} _____ cfs		*Natural Stage _____	
Q_{100} _____ cfs		*Natural Stage _____	
** $Q_{overtopping}$_____ cfs		Min. Road Elev. _____	
** Q_{500} _____ cfs		Stage with Backwater _____	
***Extreme H.W.: Location _____	Stage _____	Date _____	

* Natural (i.e. downstream) stage elevation is the downstream elevation and does not include backwater for the design discharge. This is also the stage used when computing design clearance (i.e. freeboard). High water in the bridge opening is usually similar to the natural stage (see FHWA's HDS No. 1, page 7). Design high water for a culvert is the headwater (HW) caused by the culvert. Natural (downstream) stage for a culvert is the culvert's tailwater (see FHWA's HDS No. 5, pages 36 & 37).

** Use the graph in Appendix L to calculate Q_{500} from Q_{50}. Use only the lesser of $Q_{overtopping}$ and Q_{500}.

*** See Appendix F for an explanation of Extreme High Water. See Appendix H for instructions on setting high water marks from known floods.

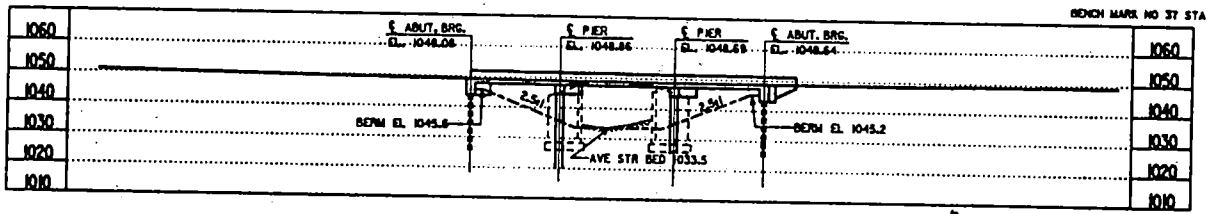
See the section "Design Guidelines", beginning on page 4, for further guidance on design high water, roadgrade overflow, and hydrology.

5. Plan View - Show present ground elevations and features. Show proposed channel clean out, wing dikes, and approach roadways. Identify shots such as edge of water, flowlines, edge of pavement and shoulders, ditches, etc. Show proposed bridge. Show present structure in dashed lines. Enough ground shots should be included to adequately describe the topography of the area. Existing roadgrade elevations are also needed.

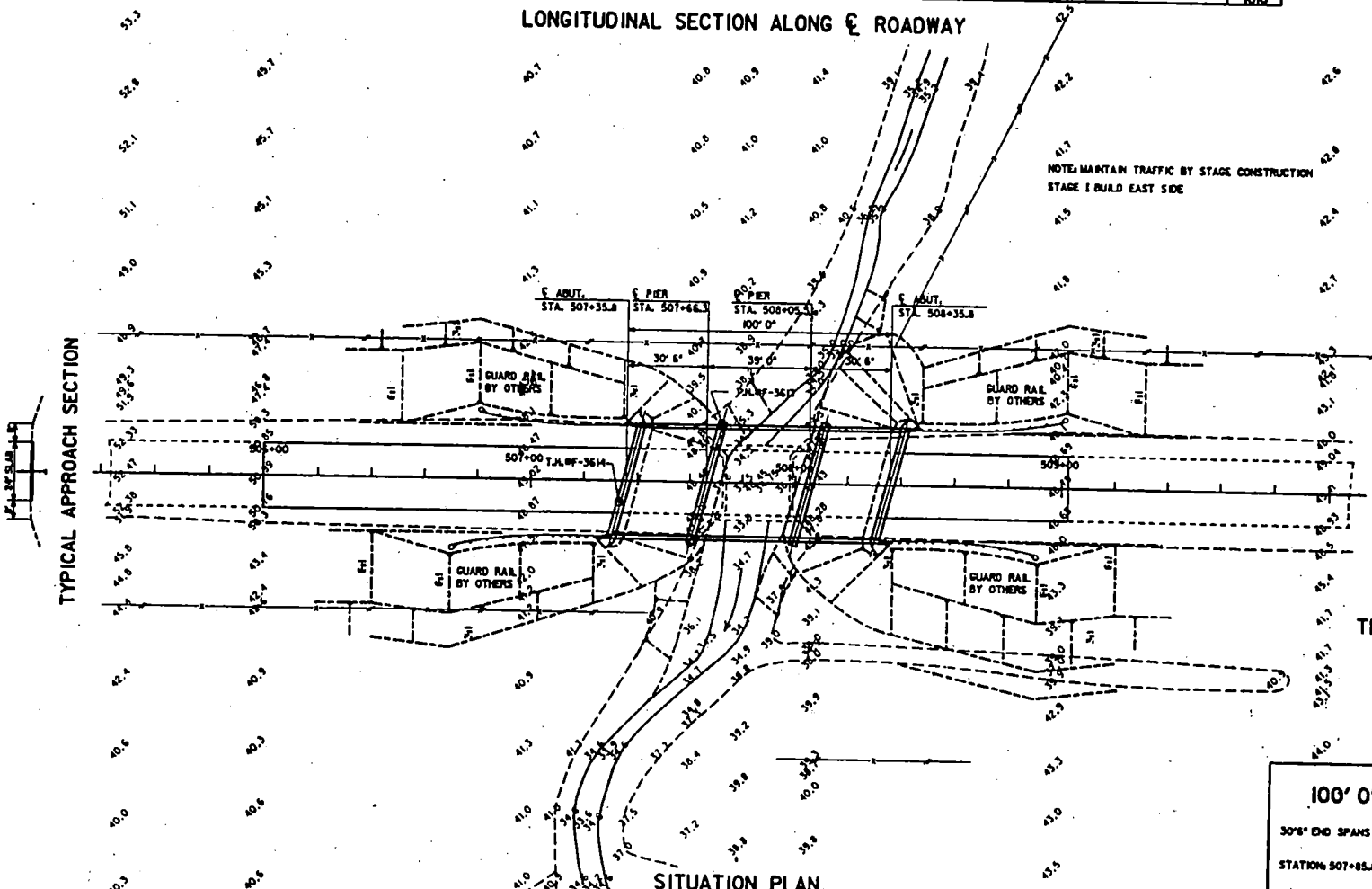
6. Typical Approach Section - Indicate roadway section that will be constructed at the crossing.

7. Longitudinal Section - This view should show berm slopes, berms, low concrete or steel elevation, profile grade elevations at abutments and piers, stream bed, design high water, extreme high water, proposed grade and present goundline.

8. Vertical and Horizontal Curve Data - List all geometric data that affects the structure and the road grade.



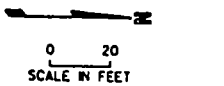
LONGITUDINAL SECTION ALONG ℄ ROADWAY



SITUATION PLAN

TYPICAL APPROACH SECTION

NOTE: MAINTAIN TRAFFIC BY STAGE CONSTRUCTION
STAGE I BUILD EAST SIDE



PROFILE

- 1.96 % + 0.49%

PI STA 507+50 VC = 300'
PI ELEV 1048.05

PROPOSED GRADE ON US # 65

HYDRAULIC DATA

DRAINAGE AREA= 13 SQ MILES
STREAM SLOPE= 13.60 FT./MI.

Q_{50}= 2777 CFS
NATURAL STAGE= 1042.6

Q_{100} = 3315 CFS
NATURAL STAGE= 1043.1

Q_{500}= 5385 CFS
STAGE W/BACKWATER= 1044.4

EXTREME HW STAGE=1044.5
DATE= X

LOCATION

OVER MINERVA CREEK
T 85 N R 21 W
SECTION 20 21
LINCOLN TOWNSHIP
STORY COUNTY
BRIDGE MAINT. NO. 8522.75065

TRAFFIC ESTIMATE

1988= 1,790 VPD
2008= 2,510 VPD
23% TRUCKS

PRELIMINARY

DESIGN FOR 15° SKEW

100' 0" X 40' CONT. CONCRETE SLAB BRIDGE

30'6" END SPANS 39' 0" CENTER SPAN

SITUATION PLAN

STATION 507+85.8 X

STORY COUNTY

IOWA DEPARTMENT OF TRANSPORTATION—HIGHWAY DIVISION
DESIGN SHEET NO. X OF X FILE NO. 28094 DESIGN NO. 191

DESIGNED BY _____ TRACED BY _____
DETAILED BY _____ CHECKED BY _____

STORY COUNTY PROJECT NUMBER F-65-5(17)--20-85

STATE IOWA

11

FLOODPLAIN AND ENVIRONMENTAL PERMITS

Department of Natural Resources

In Appendix C you will find excerpts from the Iowa Administrative Code pertaining to DNR's floodplain regulations. These excerpts should clarify which structure and roadway plans must be submitted to DNR for approval. DNR works with the Federal Emergency Management Agency (FEMA) to administer the National Flood Insurance Program in Iowa. See Appendix B for a list of Flood Insurance Studies (FIS) in Iowa. See page 6 in section "Design Guidelines" and Appendix C for discussion on DNR's backwater and freeboard criteria.

Be advised, once a FIS has been adopted by a city or county, it is the law. Therefore, you must meet the requirements of the FIS. If you cannot meet the requirements, you can request a variance of the law; or, if you believe the study is in error, you can request to have the FIS corrected. Check with DNR if questions arise.

Channel changes are allowed on many streams, although there are restrictions on how much channel work can be done. Mitigation for environmental damage may be required for channel changes. DNR may grant variances to their channel change criteria in some instances (see 72.31(B) in Appendix C. Channel changes are prohibited on "Protected Streams" (see 72.50 in Appendix C), found primarily in northeast Iowa. The number of streams classified as "Protected" increased significantly in a 1994 rule change. Many more counties and cities now have Protected Streams.

If you build a bridge over a stream classified as "meandered", or if you do work on state-owned land (parks, etc.), the plans must be sent to DNR's Sovereign Lands Section for approval. A list of "meandered" streams is given in Appendix D. There are no specific criteria that must be met in order to obtain this DNR Construction Permit. (This permit is **not** the same as the Flood Plain Permit.)

Corps of Engineers

Appendix A outlines when structures and road work need 404 Permits from the Corps of Engineers (COE). Special emphasis has been put on saving our wetlands, so you should be cautious about impacting wetlands. Since river bottom land is almost always considered wetlands, keep your channel changes to a minimum. Any channel shaping requires notification to the COE; however, limited impacts may meet nationwide permit criteria. See Appendix A for more complete information. Refer to the "Corps of Engineers and Iowa Department of Natural Resources Joint Application Form" (available from COE or DNR) for more complete instructions when making an application.

SUMMARY

Please use the sample preliminary plan on page 11 as a format for required information on your preliminary bridge design submittals. This information should be submitted for all structures that require a Form 1-E, that is, any new bridge or culvert with spans totalling 20 feet or more. For all structures submitted to IDOT for TS&L review, even small structures, we prefer that the sample preliminary plan format be used.

The submittal of the above information with your preliminary design will allow us to be of more help to you in determining the correct structure for you to construct. It also will allow us to process your plans more quickly. Submit one copy of the Form 1-E and preliminary plans to the Transportation Center. **At the same time**, submit three (3) copies of the preliminary plans along with one(1) copy of the Form 1-E, Risk Assessment, photos, and hydraulic calculations to the Office of Local Systems in Ames.

Always send prints for the preliminary and structural review. Keep your originals (e.g. mylars) until the final design review comments have been received and incorporated into the plans. These original plans are far too valuable to send in the mail unnecessarily.

SUBMITTAL CHECK LIST

1. Completed preliminary plan. See section "Completing the Preliminary Bridge Plan".

2. Hydraulic calculations.

3. Completed Form 1-E (Form 621003). See Appendix F.

4. Completed Risk Assessment form. See Appendix F.

5. Site photos.

6. Road plans.

7. Complete submittal letter.
   a. Proposed letting date and location of letting.
   b. A valid project number (check with the Office of Local Systems).
   c. Type of review requested.

8. Determine if DNR Flood Plain approval is needed or if Flood Insurance Study requirements are met. See Appendices B and C.

9. Determine if crossing is on state-owned "meandered" stream and in need of DNR Construction Permit. See Appendix D.

10. Determine if 404 Permit is needed. See Appendix A.

11. Mail one copy of the completed preliminary plan to the Local Systems Engineer at the IDOT Transportation Center and three copies to the Office of Local Systems in Ames along with one copy of the T. S. & L. information. Local Systems will forward the T.S. & L. information to the Office of Bridges and Structures to complete a hydraulic review.

APPENDIX A

404 PERMITS

The following information is the Iowa DOT's interpretation of the United States Army Corps of Engineers' (COE) 404 Permit program as it pertains to county and city bridge and road projects.

The COE usually accepts United States Department of Agriculture Natural Resource Conservation Service (NRCS) determinations of wetland impacts on agricultural land. Therefore, your first contact will be with your NRCS office to determine if any wetlands are impacted by your project. Cultivated areas termed "Prior Converted" (PC) by the NRCS are not regulated as wetlands. Cultivated areas that are called "Farmed Wetlands" (FW) are regulated by COE. If your NRCS office is unable or unavailable to help you determine if wetlands are impacted, you can ask the COE to make that determination. In either case, it is your responsibility to delineate (measure) wetland impacts.

> CAUTION: The ultimate call on jurisdictional wetlands and type of permit required is the COE's. On occasion, this could differ from the NRCS determination. When in doubt, call COE as early as possible to avoid costly delays later on.

Examples of wetlands, with hydric soils present, are as follows:

1. Timbered or non-timbered river bottom land.
2. Potholes.
3. Grassed waterways.

If wetlands are impacted, you must investigate whether your bridge or road project can be built under a Nationwide Permit (NWP) without prior notification to the COE, or if you must apply to COE for a Nationwide or Individual Permit. The drawing on page A-3, entitled "An Interpretation of Wetland Permits as Applied to County Road/Bridge Projects," COE's Fact Sheet No. 4 (IA), (pages A6-A19) and an excerpt from COE's 1987 "Wetland Delineation Manual"(pages A20-A23) will help you in that determination.

Projects will be approved more quickly if you include a mitigation plan with your original submittal and thereby save correspondence time. Any project that does not meet the conditions of a NWP (usually NWP 14 or NWP 26) must be reviewed by the COE and will usually require satisfactory mitigation for the loss of wetlands. This is generally on an acre-for-acre basis for non-timbered wetlands and at a 2:1 ratio for timbered wetlands. The ideal wetland mitigation will be in the vicinity of the wetlands that are impacted. However, sometimes wetland restoration that is remote from the project may also be acceptable. Borrow areas can be also be modified to become wetlands and be used for part of the mitigation. Remember, a main objective of this program is to protect wetlands. The desirable solution is to avoid or minimize the impact to existing wetlands. Impacts can be minimized by keeping channel shaping and road relocation to an absolute minimum on all projects. The loss of wetlands is mitigated by restoring, enhancing, creating, or preserving wetlands to replace those lost to road and bridge construction.

The COE has developed a set of maps showing which streams in Iowa carry 5 cfs or more. The COE considers the 5 cfs point to be "headwaters of the stream." The streams are shaded on the map of your county which was included in a letter sent to all county Engineers on May 4, 1992. Projects on streams less than 5 cfs may be eligible for NWP 26.

A report needs to be submitted to the COE within 30 days of completion of the work even if less than 1/3 acre of wetlands is impacted (see A-3). If between 1/3 and 3 acres are impacted or if the affected stream has less than 5 cfs, the COE must be notified in accordance with the "Notification" general condition (see Fact Sheet No. 4 (IA). If more than 3 acres are impacted or if the affected stream has greater than 5 cfs, the project will need an individual permit. You should contact the COE for a ruling when in doubt. Your contact will be:

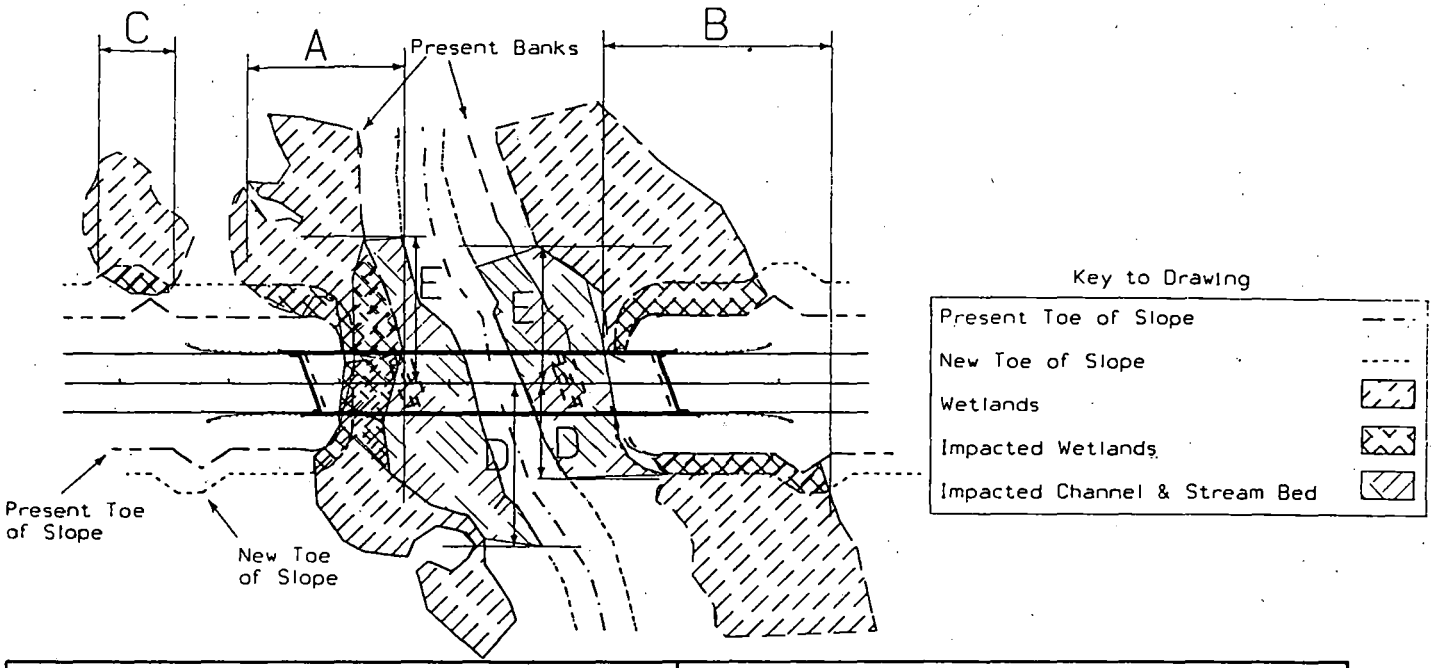
Mr. Michael D. Hayes
U.S. Army Corps of Engineers
Rock Island District
Regulatory Division
Clock Tower Building
P.O. Box 2004
Rock Island, IL 61204-2004
309-794-5367

The old 200 cubic yard note is no longer applicable. See page A-4 for the revised "Determination of Need for 404 Permit." The following note must be added to your road or bridge plan title sheet: "THIS PROJECT IS COVERED BY THE CORPS OF ENGINEERS PERMIT #_____." (May be NWP 14 or 26 as applicable). The permit number must be shown on the title sheet, whether it is an individual permit or a nationwide permit.

CAUTION: The COE District Engineer has discretionary authority to require an individual permit on a case by case basis. Highly controversial projects, in particular, should be examined carefully. These should be submitted to the COE regardless of the amount of wetlands involved.

If you have any questions about Appendix A, call the Secondary Roads Engineer (515-239-1506) at the Office of Local Systems in Ames.

AN INTERPRETATION OF WETLAND PERMITS AS APPLIED TO COUNTY ROAD/BRIDGE PROJECTS



Stream Under 5 cfs (See A-4)			Stream Over 5 cfs (See A-4)		
Amount of Impacted Wetlands	**Permit Type**	**To COE?**	**Amount of Impacted Wetlands**	**Permit Type**	**To COE?**
None	14	No	None	14	No
Less Than 1/3 Acre (5) & A+B+C < 200'	14	Yes (3)	Less Than 1/3 Acre (5) & A+B+C < 200'	14	Yes (3)
Less Than 1/3 Acre (5) & A+B+C > 200' & D(1)+E(1) < 500'	26 (6)	Yes (2)	Greater Than 1/3 Acre (5) or A+B+C > 200'	Individual	Yes (4)
Between 1/3 to 3 Acres (5) & D(1)+ E(1) < 500'	26 (6)	Yes (3)			
More Than 3 Acres (5) or D(1)+E(1) > 500'	individual	Yes (4)			

1. Use the larger of the two distances

2. A report describing the work must be submitted to the Army Corps of Engineers (COE) within 30 days of completion of the project. See NWP 26 reporting details on Fact Sheet No. 4 (IA).

3. The COE must be notified according to General Condition 13 found on Fact Sheet NO. 4 (IA). Allow 30-45 days for COE to respond to notification.

4. Joint Application form required.

5. Area refers to the total area affected by project (dredged or filled, including rip rap) in wetlands, other waters, or within the channel.

6. NWP 26 will expire on December 13, 1998. All earthwork impacts authorized via NWP 26 must be completed by December 13, 1998.

REFER TO THE ATTACHED U.S. ARMY CORPS OF ENGINEERS (COE) FACT SHEET NO. 4 (IA) FOR EXPLANATION OF THE NATIONWIDE PERMIT (NWP) TYPES.

Determination of Need for 404 Permit

Use this sheet and the "Average Annual Runoff" map (page A-5) to determine the area of fill for a temporary runaround that will be placed during construction of a bridge. This area of fill determines if the bridge project qualifies for a Nationwide Permit No. 14.

Project Data

County_____ Design Number_____

Project Number_____ File Number_____

Name of Stream_____ Drainage Area (DA)_____

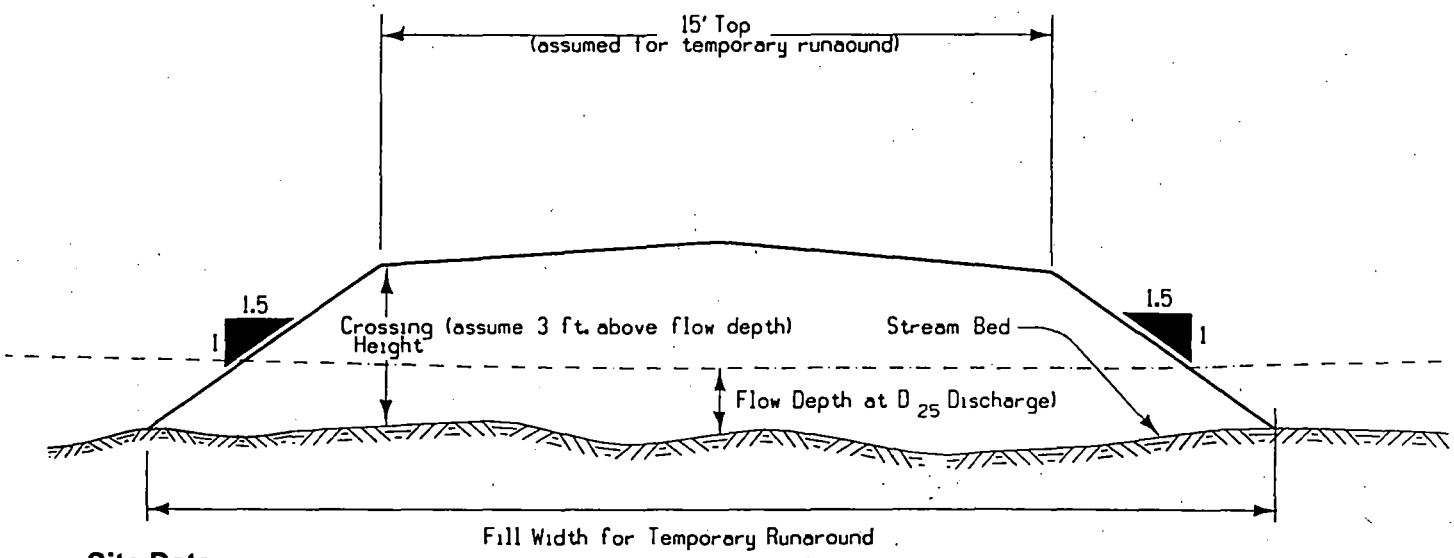
From Average Annual Runoff Map

Average Annual Runoff =_____inches (From Iowa Map on Page A-5)

Average Flow (Q_A) = 0.0737 X _____ (DA) X _____ (Runoff) = _____ (Q_A) cfs

Location of Stream: Northwest or Central or East (Circle one)

25% Duration Flow (D_{25}) = _____ X _____ (Q_A) (_____) = _____cfs



Site Data

Ave. Streambed Elev. _____

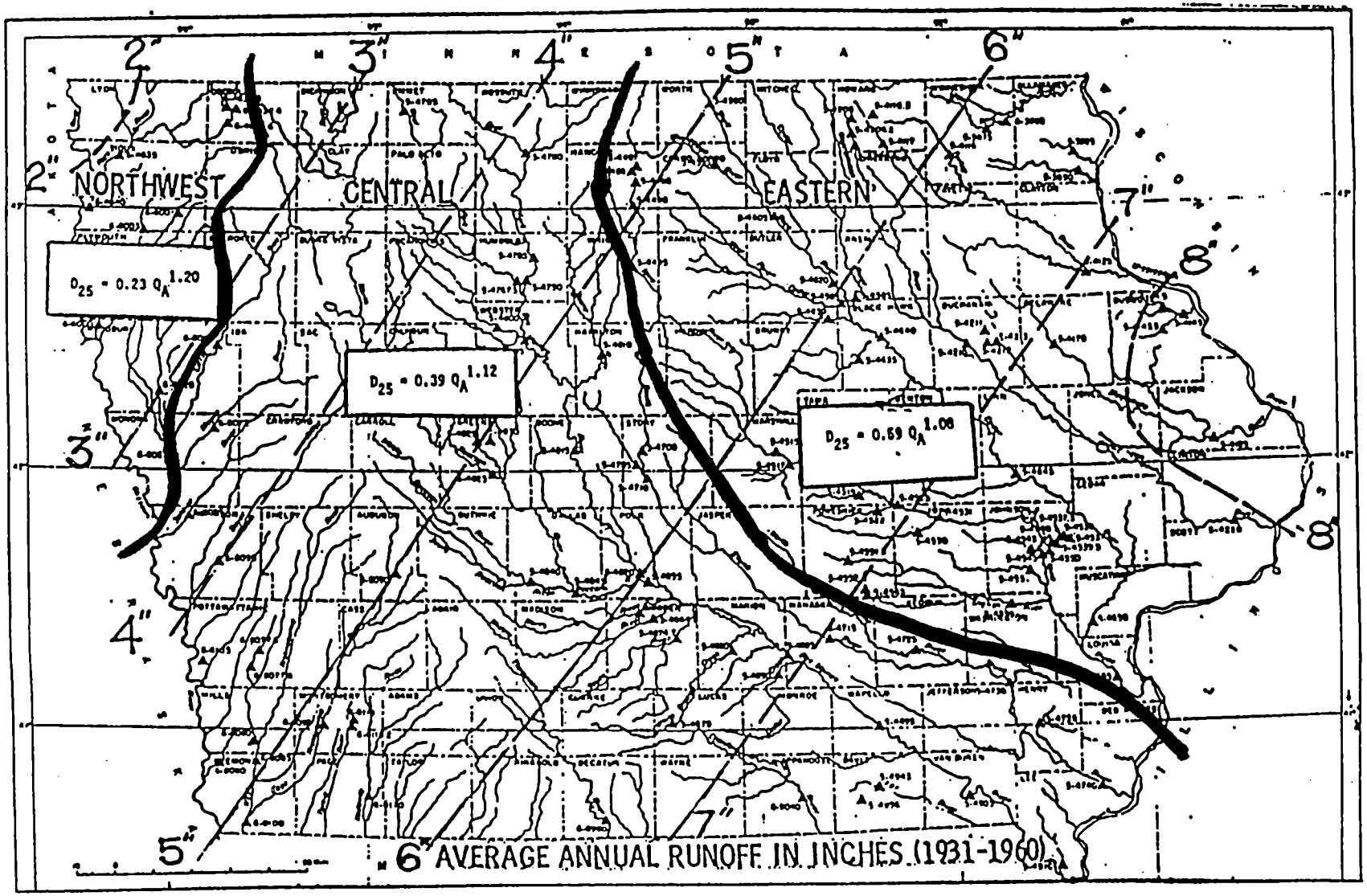
Depth of D_{25} (from rating curve*) = _____ feet (or, elevation _____)

Stream Width at D_{25} flow = _____ feet

Area Covered by Temporary Runaround = _____ (Fill width) feet X _____ (Stream width) feet = _____ ft^2

If no wetlands are involved, this area can be as large as 14,520 ft^2 (⅓ acre) for all streams and the bridge construction can be covered by Nationwide Permit No. 14. If wetlands are involved, NWP No. 14 may still apply, but the Corps must be notified.

* The rating curve, or stage-discharge curve, is developed by using a natural valley cross section and Manning's equation. PCVAL or a similar program can be used to calculate this.



INSTRUCTION FOR USE OF RUNOFF CHARGE TO DETERMINE ORDINARY HIGH WATER (D_{25}):

(1) DETERMINE Q_A (AVERAGE DISCHARGE) IN CFS. SEE EQUATION AT RIGHT.

(2) SUBSTITUTE ANDWER FOR Q_A IN EQUATION FOR D_{25}. SEE ABOVE MAP.

Q_A = 0/0737 X A X R, CFS
R = AVERAGE ANNUAL RUNOFF, INCHES
A = DRAINAGE AREA (SQUARE MILES)
D25= DISCHARGE EQUALED OR EXCEEDED 25% OR TIME (CFS).

Sample

Determination of Need for 404 Permit

Use this sheet and the "Average Annual Runoff" map (page A-5) to determine the area of fill for a temporary runaround that will be placed during construction of a bridge. This area of fill determines if the bridge project qualifies for a Nationwide Permit No. 14.

Project Data

County Delaware Design Number 197

Project Number BRF-13-3(73)--38-78 File Number 29103

Name of Stream Maquoketa River Drainage Area (DA) 270 mi²

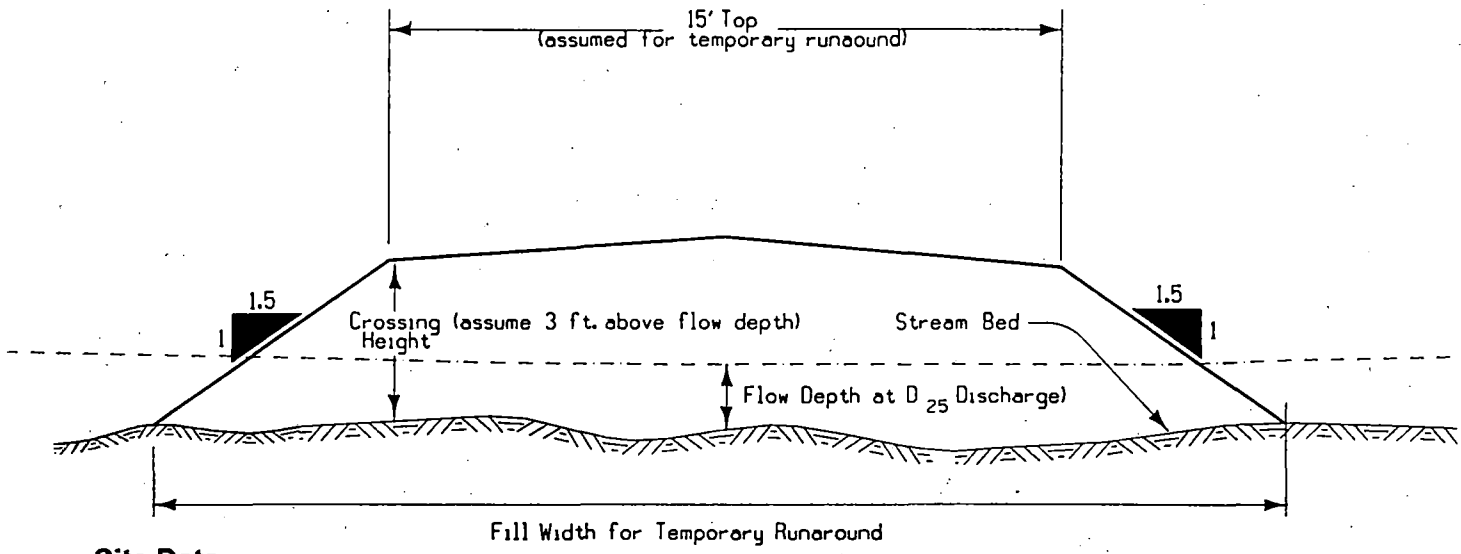
From Average Annual Runoff Map

Average Annual Runoff = 7.0 inches (From Iowa Map on Page A-5)

Average Flow (Q_A) = 0.0737 X 270 (DA) X 7.0 (Runoff) = 139 (Q_A) cfs

Location of Stream: Northwest or Central or East (Circle one)

25% Duration Flow (D_{25}) = 0.59 X 139 (Q_A) (1.08) = 122 cfs



Site Data

Ave. Streambed Elev. 1127.0

Depth of D_{25} (from rating curve*) = 2.5 feet (or, elevation 1129.5)

Stream Width at D_{25} flow = 90 feet

Area Covered by Temporary Runaround = 30 (Fill width) feet X 90 (Stream width) feet = 2700 ft²

If no wetlands are involved, this area can be as large as 14,520 ft² (⅓ acre) for all streams and the bridge construction can be covered by Nationwide Permit No. 14. If wetlands are involved, NWP No. 14 may still apply, but the Corps must be notified.

* The rating curve, or stage-discharge curve, is developed by using a natural valley cross section and Manning's equation. PCVAL or a similar program can be used to calculate this.

FACT SHEET NO. 4(IA)

US Army Corps
of Engineers
Rock Island District

NATIONWIDE PERMITS IN IOWA

EFFECTIVE DATE: FEBRUARY 11, 1997

On December 13, 1996, the Corps of Engineers published in the Federal Register, the Final Rule for the Nationwide Permits Program under the Rivers and Harbors Act of 1899; the Clean Water Act; and the Marine Protection, Research and Sanctuaries Act. These rules became effective on February 11, 1997.

The Nationwide Permit Program is an integral part of the Corps' Regulatory Program. The nationwide Permits are a form of general permits issued by the Chief of Engineers and are intended to apply throughout the entire United States and its territories. A listing of the nationwide permits and special conditions is included herein.

Permits, issued by the Corps of Engineers, under the authority of Section 404 of the Clean Water Act may not be issued until the state (where the discharge will occur) certifies, under Section 401 of the Act, that the discharge will comply with the water quality standards of the state. The Iowa Department of Natural Resources issued water quality certification for all nationwide permits.

Nationwide Permits 5, 7, 12, 13, 14, 17, 18, 21, 26, 27, 29, 31, 33, 34, 37, 38, and 40 require the permittee notify the District Engineer at least 30 to 45 days prior to performing the discharge under certain circumstances. Specific instructions for these notifications are contained in General Condition 13, a copy of which is included.

COMMENTS

The nationwide permits provide a simplified, expeditious means of project authorization under the various authorities of the Corps of Engineers. We encourage prospective permit applicants to consider the advantages of nationwide permit authorization during the preliminary design of their projects. Assistance and further information regarding all aspects of the Corps of Engineers Regulatory Program may be obtained by contacting the appropriate Corps of Engineers District (the Omaha District has regulatory jurisdiction over the Missouri River, its contiguous wetlands, and Carter Lake. The remainder of the projects occurring in Iowa are regulated by the Rock Island District.):

US Army Engineer District, Rock Island
Clock Tower Building
Post Office Box 2004
Rock Island, Illinois 61204-2004

Telephone: (309) 794-5370

US Army Engineer District, Omaha
Post Office Box 5
Omaha, Nebraska 68101-0005

Telephone: (402) 221-4211

Nationwide Permits and Conditions

The following is a list of the nationwide permits, authorized by the Chief of Engineers, and published in the Federal Register (61 FR 65873). Permittees wishing to conduct activities under the nationwide permits must comply with the conditions published in Section C. The Nationwide Permit Conditions found in Section C have been reprinted at the end of this Fact Sheet. The parenthetical references (Section 10, Section 404) following each nationwide permit indicate the specific authority under which that permit is issued.

B. NATIONWIDE PERMITS

1. **Aids to Navigation.** The placement of aids to navigation and regulatory markers which are approved by and installed in accordance with the requirements of the U.S. Coast Guard. (See 33 CFR part 66, chapter I, subchapter C). (Section 10)

2. **Structures in Artificial Canals.** Structures constructed in artificial canals within principally residential developments where the connection of the canal to a navigable water of the United States has been previously authorized (see 33 CFR 322.5(g)). (Section 10)

3. **Maintenance.** The repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area including those due to changes in materials, construction techniques, or current construction codes or safety standards which are necessary to make repair, rehabilitation, or replacement are permitted, provided the environmental effects resulting from such repair, rehabilitation, or replacement are minimal. Currently serviceable means useable as is or with some maintenance, but not so degraded as to essentially require reconstruction. This NWP authorizes the repair, rehabilitation, or replacement of those structures destroyed by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced or under contract to commence within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the District Engineer, provided the permittee can demonstrate funding, contract, or other similar delays. Maintenance dredging and beach restoration are not authorized by this NWP. (Sections 10 and 404)

4. **Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities.** Fish and wildlife harvesting devices and activities such as pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, clam and oyster digging; and small fish attraction devices such as open water fish concentrators (sea kites, etc.). This NWP authorizes shellfish seeding provided this activity does not occur in wetlands or sites that support submerged aquatic vegetation (including sites where submerged aquatic vegetation is documented to exist, but may not be present in a given year.). This NWP does not authorize artificial reefs or impoundments and semi-impoundments of waters of the United States for the culture or holding of motile species such as lobster, or the use of covered oyster trays or clam racks. (Sections 10 and 404)

5. **Scientific Measurement Devices.** Devices whose purpose is to measure and record scientific data such as staff gages, tide gages, water recording devices, water quality testing and improvement devices and similar structures. Small weirs and flumes constructed primarily to record water quantity and velocity are also authorized provided the discharge is limited to 25 cubic yards and further for discharges of 10 to 25 cubic yards provided the permittee notifies the District Engineer in accordance with the "Notification" general condition. (Sections 10 and 404)

6. **Survey Activities.** Survey activities including core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, soil survey and sampling, and historic resources surveys. Discharges and structures associated with the recovery of historic resources are not authorized by this NWP. Drilling and the discharge of excavated material from test wells for oil and gas exploration is not authorized by this NWP; the plugging of such wells is authorized. Fill placed for roads, pads and other similar activities is not authorized by this NWP. The NWP does not authorize any permanent structures. The discharge of drilling muds and cuttings may require a permit under section 402 of the Clean Water Act. (Sections 10 and 404)

7. **Outfall Structures.** Activities related to construction of outfall structures and associated intake structures where the effluent from the outfall is authorized, conditionally

authorized, or specifically exempted, or are otherwise in compliance with regulations issued under the National Pollutant Discharge Elimination System program (Section 402 of the Clean Water Act), provided that the permittee notifies the District Engineer in accordance with the "Notification" general condition. (Also see 33 CFR 330.1(e)). Intake structures per se are not included--only those directly associated with an outfall structure. (Sections 10 and 404)

8. **Oil and Gas Structures.** Structures for the exploration, production, and transportation of oil, gas, and minerals on the outer continental shelf within areas leased for such purposes by the Department of the Interior, Minerals Management Service. Such structures shall not be placed within the limits of any designated shipping safety fairway or traffic separation scheme, except temporary anchors that comply with the fairway regulations in 33 CFR 322.5(l). (Where such limits have not been designated, or where changes are anticipated, District Engineers will consider asserting discretionary authority in accordance with 33 CFR 330.4(e) and will also review such proposals to ensure they comply with the provisions of the fairway regulations in 33 CFR 322.5(l). Any Corps review under this permit will be limited to the effects on navigation and national security in accordance with 33 CFR 322.5(f)). Such structures will not be placed in established danger zones or restricted areas as designated in 33 CFR part 334: nor will such structures be permitted in EPA or Corps designated dredged material disposal areas. (Section 10)

9. **Structures in Fleeting and Anchorage Areas.** Structures, buoys, floats and other devices placed within anchorage or fleeting areas to facilitate moorage of vessels where such areas have been established for that purpose by the U.S. Coast Guard. (Section 10)

10. **Mooring Buoys.** Non-commercial, single-boat, mooring buoys. (Section 10)

11. **Temporary Recreational Structures.** Temporary buoys, markers, small floating docks, and similar structures placed for recreational use during specific events such as water skiing competitions and boat races or seasonal use provided that such structures are removed within 30 days after use has been discontinued. At Corps of Engineers reservoirs, the reservoir manager must approve each buoy or marker individually. (Section 10)

12. **Utility Line Discharges.** Discharges of dredged or fill material associated with excavation, backfill or bedding for utility lines, including outfall and intake structures, provided there is no change in preconstruction contours. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone and telegraph messages, and radio and television communication. The term "utility line" does not include activities which drain a water of the United States, such as drainage tile; however, it does apply to pipes conveying drainage from another area. This NWP authorizes mechanized landclearing necessary for the installation of utility lines, including overhead utility lines, provided the cleared area is kept to the minimum necessary and preconstruction contours are maintained. However, access roads, temporary or permanent, or foundations associated with overhead utility lines are not authorized by this NWP. Material resulting from trench excavation may be temporarily sidecast (up to three months) into waters of the United States, provided that the material is not placed in such a manner that it is dispersed by currents or other forces. The DE may extend the period of temporary side-casting not to exceed a total of 180 days, where appropriate. The area of waters of the United States that is disturbed must be limited to the minimum necessary to construct the utility line. In wetlands, the top 6" to 12" of the trench should generally be backfilled with topsoil from the trench. Excess material must be removed to upland areas immediately upon completion of construction. Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line. (See 33 CFR part 322).

Notification: The permittee must notify the district engineer in accordance with the "Notification" general condition, if any of the following criteria are met:

(a) Mechanized landclearing in a forested wetland;

(b) A Section 10 permit is required for the utility line;

(c) The utility line in waters of the United States exceeds 500 feet; or,

(d) The utility line is placed within a jurisdictional area (i.e., a water of the United States), and it runs parallel to a streambed that is within that jurisdictional area. (Sections 10 and 404)

13. **Bank Stabilization.** Bank stabilization activities necessary for erosion prevention provided the activity meets all of the following criteria:

a. No material is placed in excess of the minimum needed for erosion protection;

b. The bank stabilization activity is less than 500 feet in length;

c. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line;

d. No material is placed in any special aquatic site, including wetlands;

e. No material is of the type, or is placed in any location, or in any manner, so as to impair surface water flow into or out of any wetland area;

f. No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored trees and treetops may be used in low energy areas); and,

g. The activity is part of a single and complete project.

Bank stabilization activities in excess of 500 feet in length or greater than an average of one cubic yard per running foot may be authorized if the permittee notifies the District Engineer in accordance with the "Notification" general condition and the District Engineer determines the activity complies with the other terms and conditions of the NWP and the adverse environmental effects are minimal both individually and cumulatively. This NWP may not be used for the channelization of a water of the Unitied States. (Sections 10 and 404)

14. **Road Crossings.** Fills for roads crossing waters of the United States (including wetlands and other special aquatic sites) provided the activity meets all of the following criteria:

a. The width of the fill is limited to the minimum necessary for the actual crossing;

b. The fill placed in waters of the United States is limited to a filled area of no more than 1/3 acre. Furthermore, no more than a total of 200 linear feet of the fill for the roadway can occur in special aquatic sites, including wetlands;

c. The crossing is culverted, bridged or otherwise designed to prevent the restriction of, and to withstand, expected high flows and tidal flows, and to prevent the restriction of low flows and the movement of aquatic organisms;

d. The crossing, including all attendant features, both temporary and permanent, is part of a single and complete project for crossing of a water of the United States; and,

e. For fills in special aquatic sites, including wetlands, the permittee notifies the District Engineer in accordance with the "Notification" general condition. The notification must also include a delineation of affected special aquatic sites, including wetlands.

This NWP may not be combined with NWP 18 or NWP 26 for the purpose of increasing the footprint of the road crossing. Some road fills may be eligible for an exemption from the need for a Section 404 permit altogether (see 33 CFR 323.4). Also, where local circumstances indicate the need, District Engineers will define the term "expected high flows" for the purpose of establishing applicability of this NWP. (Sections 10 and 404)

15. **U.S. Coast Guard Approved Bridges.** Discharges of dredged or fill material incidental to the construction of bridges across navigable waters of the United States, including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills provided such discharges have been authorized by the U.S. Coast Guard as part of the bridge permit. Causeways and approach fills are not included in this NWP and will require an individual or regional Section 404 permit. (Section 404)

16. **Return Water From Upland Contained Disposal Areas.** Return water from an upland, contained dredged material disposal area. The dredging itself may require a section 404 permit (33 CFR 323.2(d)), but will require a Section 10 permit if located in navigable waters of the United States. The return water from a contained disposal area is administratively defined as a discharge of dredged material by 33 CFR 323.2(d) even though the disposal itself occurs on the upland and thus does not require a Section 404 permit. This NWP satisfies the technical requirement for a Section 404 permit for the return water where the quality of the return water is controlled by the state through the Section 401 certification procedures. (Section 404)

17. **Hydropower Projects.** Discharges of dredged or fill material associated with (a) small hydropower projects at existing reservoirs where the project, which includes the fill, are licensed by the Federal Energy Regulatory Commission (FERC) under the Federal Power Act of 1920, as amended; and has a total generating capacity of not more than 5000 KW; and the permittee notifies the District Engineer in accordance with the "Notification" general condition; or (b) hydropower projects for which the FERC has granted an exemption from licensing pursuant to section 408 of the Energy Security Act of 1980 (16 U.S.C. 2705 and 2708) and section 30 of the Federal Power Act, as amended; provided the permittee notifies the District Engineer in accordance with the "Notification" general condition. (Section 404)

18. **Minor Discharges.** Minor discharges of dredged or fill material into all waters of the United States provided that the activity meets all of the following criteria:

a. The quantity of discharged material and the volume of excavated area does not exceed 25 cubic yards below the plane of the ordinary high water mark or the high tide line;

b. The discharge, including any excavated area, will not cause the loss of more than 1/10 acre of a special aquatic site, including wetlands. For the purposes of this NWP, the acreage limitation includes the filled area and excavated area plus special aquatic sites that are adversely affected by flooding and special aquatic sites that are drained so that they would no longer be a water of the United States as a result of the project;

c. If the discharge, including any excavated area, exceeds 10 cubic yards below the plane of the ordinary high water mark or the high tide line or if the discharge is in a special aquatic site, including wetlands, the permittee notifies the District Engineer in accordance with the "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands (Also see 33 CFR 330.1(e)); and

d. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project and is not placed for the purpose of a stream diversion.

e. This NWP can not be used in conjunction with NWP 26 for any single and complete project. (Sections 10 and 404)

19. **Minor Dredging.** Dredging of no more than 25 cubic yards below the plane of the ordinary high water mark or the mean high water mark from navigable waters of the United States (i.e., Section 10 waters) as part of a single and complete project. This NWP does not authorize the dredging or degradation through siltation of coral reefs, sites that support submerged aquatic vegetation (including sites where submerged aquatic vegetation is documented to exist, but may not be present in a given year), anadromous fish spawning areas, or wetlands, or the connection of canals or other artificial waterways to navigable waters of the United States (see 33 CFR 322.5(g)). (Sections 10 and 404)

20. **Oil Spill Cleanup.** Activities required for the containment and cleanup of oil and hazardous substances which are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR part 300) provided that the work is done in accordance with the Spill Control and Countermeasure Plan required by 40 CFR part 112.3 and any existing State contingency plan and provided that the Regional Response Team (if one exists in the area) concurs with the proposed containment and cleanup action. (Sections 10 and 404)

21. **Surface Coal Mining Activities.** Activities associated with surface coal mining activities provided they are authorized by the Department of the Interior, Office of Surface Mining (OSM), or by states with approved programs under Title V of the Surface Mining Control and Reclamation Act of 1977 and provided the permittee notifies the District Engineer in accordance with the "Notification" general condition. The notification must include an OSM or state approved mitigation plan. The Corps, at the discretion of the District Engineer, may require a bond to ensure success of the mitigation, if no other Federal or state agency has required one. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. (Also see 33 CFR 330.1(e)) (Sections 10 and 404)

22. **Removal of Vessels.** Temporary structures or minor discharges of dredged or fill material required for the removal of wrecked, abandoned, or disabled vessels, or the removal of man-made obstructions to navigation. This NWP does not authorize the removal of vessels listed or determined eligible for listing on the National Register of Historic Places unless the District Engineer is notified and indicates that there is compliance with the "Historic Properties" general condition. This NWP does not authorize maintenance dredging, shoal removal, or river bank snagging. Vessel disposal in waters of the United States may need a permit from EPA (see 40 CFR 229.3). (Sections 10 and 404)

23. **Approved Categorical Exclusions.** Activities undertaken, assisted, authorized, regulated, funded, or financed, in whole or in part, by another Federal agency or department where that agency or department has determined, pursuant to the Council on Environmental Quality Regulation for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR part 1500 et seq.), that the activity, work, or discharge is categorically excluded from environmental documentation because it is included within a category of actions which neither individually nor cumulatively have a significant effect on the human environment, and the Office of the Chief of Engineers (ATTN: CECW-OR) has been furnished notice of the agency's or department's application for the categorical exclusion and concurs with that determination. Prior to approval for purposes of this NWP of any agency's categorical exclusions, the Chief of Engineers will solicit public comment. In addressing these comments, the Chief of Engineers may require certain conditions for authorization of an agency's categorical exclusions under this NWP. (Sections 10 and 404)

24. **State Administered Section 404 Program.** Any activity permitted by a state administering its own section 404 permit program pursuant to 33 U.S.C. 1344(g)-(l) is permitted pursuant to Section 10 of the Rivers and Harbors Act of 1899. Those activities which do not involve a Section 404 state permit are not included in this NWP, but certain structures will be exempted by Section 154 of Pub. L. 94-587, 90 Stat. 2917 (33 U.S.C. 591) (see 33 CFR 322.3(a)(2)). (Section 10)

25. **Structural Discharges.** Discharges of material such as concrete, sand, rock, etc. into tightly sealed forms or cells where the material will be used as a structural member for standard pile supported structures, such as bridges, transmission line footings, and walkways or for general navigation, such as mooring cells, including the excavation of bottom material from within the form prior to the discharge of concrete, sand, rock, etc. This NWP does not authorize filled structural members that would support buildings, homes, parking areas, storage areas and other such structures. Housepads or other building pads are also not included in this NWP. The structure itself may require a section 10 permit if located in navigable waters of the United States. (Section 404)

26. **Headwaters and Isolated Waters Discharges.** Discharges of dredged or fill material into headwaters and isolated waters provided that the activity meets all of the following criteria:

a. The discharge does not cause the loss of more than 3 acres of waters of the United States nor cause the loss of waters of the United States for a distance greater than 500 linear feet of the stream bed;

b. For discharges causing the loss of greater than 1/3 acre of waters of the United States, the permittee notifies the District Engineer in accordance with the "Notification" general condition;

c. For discharges causing a loss of 1/3 acre or less of waters of the United States the permittee must submit a report within 30 days of completion of the work, containing the information listed below;

d. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands (Also see 33 CFR 330.1(e)); and

e. The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project. Note, this NWP will expire on ~~January 21, 1999~~. December 13, 1998.

For the purposes of this NWP, the acreage of loss of waters of the United States includes the filled area plus waters of the United States that are adversely affected by flooding, excavation or drainage as a result of the project. The 3 acre and 1/3 acre limits of NWP 26 are absolute, and cannot be increased by any mitigation plan offered by the applicant or required by the District Engineer. Whenever any other NWP is used in conjunction with this NWP, the total acreage of impacts to waters of the United States of all NWPs combined, can not exceed 3 acres.

Subdivisions: For any real estate subdivision created or subdivided after October 5, 1984, a notification pursuant to Subsection (b) of this NWP is required for any discharge which would cause the aggregate total loss of waters of the United States for the entire subdivision to exceed 1/3 acre. Any discharge in any real estate subdivision which would cause the aggregate total loss of waters of the United States in the subdivision to exceed 3 acres is not authorized by this NWP; unless the District Engineer exempts a particular subdivision or parcel by making a written determination that: (1) The individual and cumulative adverse environmental effects would be minimal and the property owner had, after October 5, 1984, but prior to February 11, 1997, committed substantial resources in reliance on NWP 26 with regard to a subdivision, in circumstances where it would be inequitable to frustrate the property owner's investment-backed expectations, or (2) that the individual and cumulative adverse environmental effects would be minimal, high quality wetlands would not be adversely affected, and there would be an overall benefit to the aquatic environment. Once the exemption is established for a subdivision, subsequent lot development by individual property owners may proceed using NWP 26. For purposes of NWP 26, the term "real estate subdivision" shall be interpreted to include circumstances where a landowner or developer divides a tract of land into smaller parcels for the purpose of selling, conveying, transferring, leasing, or developing said parcels. This would include the entire area of a residential, commercial or other real estate subdivision, including all parcels and parts thereof.

Report: For discharges causing the loss of 1/3 acre or less of waters of the United States the permittee must submit a report within 30 days of completion of the work, containing the following information:

(a) Name, address, and telephone number of the permittee;

(b) Location of the work;

(c) Description of the work; and,

(d) Type and acreage (or square feet) of the loss of waters of the United States (e.g., 1/10 acre of marsh and 50 square feet of a stream.) (Section 404)

27. **Wetland and Riparian Restoration and Creation Activities.** Activities in waters of the United States associated with the restoration of former non-tidal wetlands and riparian areas, the enhancement of degraded wetlands and riparian areas, and creation of wetlands and riparian areas; (i) On non-Federal public lands and private lands, in accordance with the terms and conditions of a binding wetland restoration or creation agreement between the landowner and the U.S. Fish and Wildlife Service or the Natural Resources Conservation Service (NRCS) or voluntary wetland restoration, enhancement, and creation actions documented by the NRCS pursuant to NRCS regulations; or (ii) on any Federal land; or (iii) on reclaimed surface coal mined lands, in accordance with a Surface Mining Control and Reclamation Act permit issued by the Office of Surface Mining or the applicable state agency. (The future reversion does not apply to wetlands created, restored or enhanced as mitigation for the mining impacts, nor naturally due to hydrologic or topographic features, nor for a mitigation bank.); or (iv) on any public or private land, provided the permittee notifies the District Engineer in accordance with the "Notification" general condition.

Such activities include, but are not limited to: Installation and maintenance of small water control structures, dikes, and berms; backfilling of existing drainage ditches; removal of existing drainage structures; construction of small nesting islands; plowing or discing for seed bed preparation; and other related activities. This NWP applies to restoration projects that serve the purpose of restoring "natural" wetland hydrology, vegetation, and function to altered and degraded non-tidal wetlands and "natural" functions of riparian areas. This NWP does not authorize the conversion of natural wetlands to another aquatic use, such as creation of waterfowl impoundments where a forested wetland previously existed.

Reversion: For restoration, enhancement and creation projects conducted under paragraghs (ii) and (iv), this NWP does not authorize any future discharge of dredged or fill material associated with the reversion of the area to its prior condition. In such cases a separate permit at that time would be required for any reversion. For restoration, enhancement and creation projects conducted under paragraghs (i) and (iii), this NWP also authorizes any future discharge of dredged or fill material associated with the reversion of the area to its documented prior condition and use (i.e., prior to the restoration, enhancement, or creation activities) within five years after expiration of a limited term wetland restoration or creation agreement or permit, even if the discharge occurs after this NWP expires. The five year reversion limit does not apply to agreements without time limits reached under paragraph (i). The prior condition will be documented in the original agreement or permit, and the determination of return to prior conditions will be made by the Federal agency or appropriate state agency executing the agreement or permit. Prior to any reversion activity the permittee or the appropriate Federal or state agency must notify the District Engineer and include the documentation of the prior condition. Once an area has reverted back to its prior physical condition, it will be subject to whatever the Corps regulatory requirements will be at that future date. (Sections 10 and 404)

28. **Modifications of Existing Marinas.** Reconfiguration of existing docking facilities within an authorized marina area. No dredging, additional slips or dock spaces, or expansion of any kind within waters of the United States is authorized by this NWP. (Section 10)

29. **Single-Family Housing.** Discharges of dredged or fill material into non-tidal waters of the United States, including non-tidal wetlands for the construction or expansion of a single-family home and attendant features (such as a garage, driveway, storage shed, and/or septic field) for an individual permittee provided that the activity meets all of the following criteria:

a. The discharge does not cause the loss of more than 1/2 acre of non-tidal waters of the United States, including non-tidal wetlands;

b. The permittee notifies the District Engineer in accordance with the "Notification" general condition;

c. The permittee has taken all practicable actions to minimize the on-site and off-site impacts of the discharge. For example, the location of the home may need to be adjusted on-site to avoid flooding of adjacent property owners;

d. The discharge is part of a single and complete project; furthermore, that for any subdivision created on or after November 22, 1991, the discharges authorized under this NWP may not exceed an aggregate total loss of waters of the United States of 1/2 acre for the entire subdivision;

e. An individual may use this NWP only for a single-family home for a personal residence;

f. This NWP may be used only once per parcel;

g. This NWP may not be used in conjunction with NWP 14, NWP 18, or NWP 26, for any parcel; and,

h. Sufficient vegetated buffers must be maintained adjacent to all open water bodies, streams, etc., to preclude water quality degradation due to erosion and sedimentation.

For the purposes of this NWP, the acreage of loss of waters of the United States includes the filled area previously permitted, the proposed filled area, and any other waters of the United

States that are adversely affected by flooding, excavation, or drainage as a result of the project. Whenever any other NWP is used in conjunction with this NWP, the total acreage of impacts to waters of the United States of all NWPs combined, can not exceed 1/2 acres. This NWP authorizes activities only by individuals; for this purpose, the term "individual" refers to a natural person and/or a married couple, but does not include a corporation, partnership, or similar entity. For the purposes of this NWP, a parcel of land is defined as "the entire contiguous quantity of land in possession of, recorded as property of, or owned (in any form of ownership, including land owned as a partner, corporation, joint tenant, etc.) by the same individual (and/or that individual's spouse), and comprises not only the area of wetlands sought to be filled, but also all land contiguous to those wetlands, owned by the individual (and/or that individual's spouse) in any form of ownership". (Sections 10 and 404)

30. **Moist Soil Management for Wildlife.** Discharges of dredged or fill material and maintenance activities that are associated with moist soil management for wildlife performed on non-tidal Federally-owned or managed and State-owned or managed property, for the purpose of continuing ongoing, site-specific, wildlife management activities where soil manipulation is used to manage habitat and feeding areas for wildlife. Such activities include, but are not limited to: the repair, maintenance or replacement of existing water control structures; the repair or maintenance of dikes; and plowing or discing to impede succession, prepare seed beds, or establish fire breaks. Sufficient vegetated buffers must be maintained adjacent to all open water bodies, streams, etc., to preclude water quality degradation due to erosion and sedimentation. This NWP does not authorize the construction of new dikes, roads, water control structures, etc. associated with the management areas. This NWP does not authorize converting wetlands to uplands, impoundments or other open water bodies. (Section 404)

31. **Maintenance of Existing Flood Control Facilities.** Discharges of dredged or fill material for the maintenance of existing flood control facilities, including debris basins, retention/detention basins, and channels that were (i) previously authorized by the Corps by individual permit, general permit, or by 33 CFR 330.3 and constructed or (ii) constructed by the Corps and transferred to a local sponsor for operation and maintenance. The maintenance is limited to that approved in a maintenance baseline determination made by the District Engineer (DE). The prospective permittee will provide the DE with sufficient evidence for the DE to determine the approved and constructed baseline. Subsequent to the determination of the maintenance baseline and prior to any maintenance work, the permittee must notify the DE in accordance with the "Notification" general condition.

All dredged material must be placed in an upland site or a currently authorized disposal site in waters of the United States, and proper siltation controls must be used. This NWP does not authorize the removal of sediment and associated vegetation from natural water courses. (Activities that involve only the cutting and removing of vegetation above the ground, e.g., mowing, rotary cutting, and chainsawing, where the activity neither substantially disturbs the root system nor involves mechanized pushing, dragging, or other similar activities that redeposit excavated soil material, does not require a Section 404 permit in accordance with 33 CFR 323.2(d)(2)(ii)). Only constructed channels within stretches of natural rivers that have been previously authorized as part of a flood control facility could be authorized for maintenance under this NWP.

Maintenance Baseline: Upon receipt of sufficient evidence, the DE will determine the maintenance baseline. The maintenance baseline is the existing flood control project that the DE has determined can be maintained under this NWP, subject to any case-specific conditions required by the DE. In determining the maintenance baseline, the DE will consider the following factors: The approved facility, the actual constructed facility, the Corps constructed project that was transferred, the maintenance history, if the facility has been functioning at a reduced capacity and for how long, present vs. original flood control needs, and if sensitive/unique functions and values may be adversely affected. Revocation or modification of the final determination of the maintenance baseline can only be done in accordance with 33 CFR 330.5. This NWP can not be used until the DE determines the maintenance baseline and the need for mitigation and any regional or activity-specific conditions. The maintenance baseline will only be determined once and will remain valid for any subsequent reissuance of this NWP. However, if the project is effectively abandoned or reduced due to lack of proper maintenance, a new determination of a maintenance baseline would be required before this NWP could be used for subsequent maintenance.

Mitigation: In determining the need for mitigation, the DE will consider the following factors: Any original mitigation required, the current environmental setting, and any adverse effects of the maintenance project that were not mitigated in the original construction. The DE will not delay needed maintenance for completion of any required mitigation, provided that the DE and the applicant establish a schedule for the identification, approval, development, construction and completion of such required mitigation. (Sections 10 and 404)

32. **Completed Enforcement Actions.** Any structure, work or discharge of dredged or fill material, remaining in place, or undertaken for mitigation, restoration, or environmental benefit in compliance with either:

(i) The terms of a final written Corps non-judicial settlement agreement resolving a violation of Section 404 of the Clean Water Act (CWA) and/or Section 10 of the Rivers and Harbors Act of 1899; or the terms of an EPA 309(a) order on consent resolving a violation of Section 404 of the CWA, provided that:

a. The unauthorized activity affected no more than 5 acres of nontidal wetlands or 1 acre of tidal wetlands;

b. The settlement agreement provides for environmental benefits, to an equal or greater degree, than the environmental detriments caused by the unauthorized activity that is authorized by this nationwide permit; and

c. The District Engineer issues a verification letter authorizing the activity subject to the terms and conditions of this nationwide permit and the settlement agreement, including a specified completion date; or

(ii) The terms of a final Federal court decision, consent decree, or settlement agreement resulting from an enforcement action brought by the United States under Section 404 of the CWA and/or Section 10 of the Rivers and Harbors Act of 1899.

For both (i) or (ii) above, compliance is a condition of the NWP itself. Any authorization under this NWP is automatically revoked if the permittee does not comply with the terms of this NWP or the terms of the court decision, consent decree, or judicial/non-judicial settlement agreement or fails to complete the work by the specified completion date. This NWP does not apply to any activities occurring after the date of the decision, decree, or agreement that are not for the purpose of mitigation, restoration, or environmental benefit. Prior to reaching any settlement agreement the Corps will ensure compliance with the provisions of 33 CFR part 326 and 33 CFR 330.6 (d)(2) and (e). (Sections 10 and 404)

33. **Temporary Construction, Access and Dewatering.** Temporary structures, work and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites; provided that the associated primary activity is authorized by the Corps of Engineers or the U.S. Coast Guard, or for other construction activities not subject to the Corps or U.S. Coast Guard regulations. Appropriate measures must be taken to maintain near normal downstream flows and to minimize flooding. Fill must be of materials, and placed in a manner, that will not be eroded by expected high flows. The use of dredged material may be allowed if it is determined by the District Engineer that it will not cause more than minimal adverse effects on aquatic resources. Temporary fill must be entirely removed to upland areas, or dredged material returned to its original location, following completion of the construction activity, and the affected areas must be restored to the pre-project conditions. Cofferdams cannot be used to dewater wetlands or other aquatic areas so as to change their use. Structures left in place after cofferdams are removed require a Section 10 permit if located in navigable waters of the United States. (See 33 CFR part 322). The permittee must notify the District Engineer in accordance with the "Notification" general condition. The notification must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources. The District Engineer will add special conditions, where necessary, to ensure that adverse environmental effects are minimal. Such conditions may include: limiting the temporary work to the minimum necessary; requiring seasonal restrictions; modifying the restoration plan; and requiring alternative construction methods (e.g., construction mats in wetlands where practicable.). (Sections 10 and 404)

34. **Cranberry Production Activities.** Discharges of dredged or fill material for dikes, berms, pumps, water control structures or leveling of cranberry beds associated with expansion, enhancement, or modification activities at existing cranberry production operations provided that the activity meets all of the following criteria:

a. The cumulative total acreage of disturbance per cranberry production operation, including but not limited to, filling, flooding, ditching, or clearing, does not exceed 10 acres of waters of the United States, including wetlands;

b. The permittee notifies the District Engineer in accordance with the "Notification" general condition. The notification must include a delineation of affected special aquatic sites, including wetlands; and,

c. The activity does not result in a net loss of wetland acreage.

This NWP does not authorize any discharge of dredged or fill material related to other cranberry production activities such as warehouses, processing facilities, or parking areas. For the purposes of this NWP, the cumulative total of 10 acres will be measured over the period that this NWP is valid. (Section 404)

35. **Maintenance Dredging of Existing Basins.** Excavation and removal of accumulated sediment for maintenance of existing marina basins, access channels to marina basins or boat slips, and

boat slips to previously authorized depths or controlling depths for ingress/egress, whichever is less, provided the dredged material is disposed of at an upland site and proper siltation controls are used. (Section 10)

36. **Boat Ramps.** Activities required for the construction of boat ramps provided:

a. The discharge into waters of the United States does not exceed 50 cubic yards of concrete, rock, crushed stone or gravel into forms, or placement of pre-cast concrete planks or slabs. (Unsuitable material that causes unacceptable chemical pollution or is structurally unstable is not authorized);

b. The boat ramp does not exceed 20 feet in width;

c. The base material is crushed stone, gravel or other suitable material;

d. The excavation is limited to the area necessary for site preparation and all excavated material is removed to the upland; and,

e. No material is placed in special aquatic sites, including wetlands.

Dredging to provide access to the boat ramp may be authorized by another NWP, regional general permit, or individual permit pursuant to Section 10 if located in navigable waters of the United States. (Sections 10 and 404)

37. **Emergency Watershed Protection and Rehabilitation.** Work done by or funded by the Natural Resources Conservation Service qualifying as an "exigency" situation (requiring immediate action) under its Emergency Watershed Protection Program (7 CFR part 624) and work done or funded by the Forest Service under its Burned-Area Emergency Rehabilitation Handbook (FSH 509.13) provided the District Engineer is notified in accordance with the "Notification" general condition. (Also see 33 CFR 330.1(e)). (Sections 10 and 404)

38. **Cleanup of Hazardous and Toxic Waste.** Specific activities required to effect the containment, stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority provided the permittee notifies the District Engineer in accordance with the "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. Court ordered remedial action plans or related settlements are also authorized by this NWP. This NWP does not authorize the establishment of new disposal sites or the expansion of existing sites used for the disposal of hazardous or toxic waste. Activities undertaken entirely on a CERCLA site by authority of CERCLA as approved or required by EPA, are not required to obtain permits under section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. (Sections 10 and 404)

39. **RESERVED.**

40. **Farm Buildings.** Discharges of dredged or fill material into jurisdictional wetlands (but not including prairie potholes, playa lakes, or vernal pools) that were in agricultural crop production prior to December 23, 1985, i.e., farmed wetlands, for foundations and building pads for farm buildings. The discharge will be limited to the minimum necessary but will in no case exceed 1 acre (see the "Mitigation" Section 404 only condition). The permittee must notify the District Engineer in accordance with the "Notification" general condition for any farm building within 500 linear feet of any flowing water. (Section 404)

C. NATIONWIDE PERMIT CONDITIONS

GENERAL CONDITIONS

The following general conditions must be followed in order for any authorization by a NWP to be valid:

1. **Navigation.** No activity may cause more than a minimal adverse effect on navigation.

2. **Proper Maintenance.** Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

3. **Erosion and Siltation Controls.** Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date.

4. Aquatic Life Movements. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.

5. Equipment. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

6. Regional and Case-by-Case Conditions. The activity must comply with any regional conditions which may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state or tribe in its Section 401 water quality certification.

7. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System; or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status; unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely effect the Wild and Scenic River designation, or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service.)

8. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9. Water Quality Certification. In certain states, an individual Section 401 water quality certification must be obtained or waived (see 33 CFR 330.4(c)).

10. Coastal Zone Management. In certain states, an individual state coastal zone management consistency concurrence must be obtained or waived (see Section 330.4(d)).

11. Endangered Species. (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work on the activity until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized.

(b) Authorization of an activity by a nationwide permit does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. Fish and Wildlife Service and National Marine Fisheries Service or their world wide web pages at http://www.fws.gov/<difference>r9endspp/endspp.html and http://kingfish.spp.mnfs.gov/tmcintyr/prot_res.html#ES and Recovery, respectively.

12. Historic Properties. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the DE has complied with the provisions of 33 CFR part 325, Appendix C. The prospective permittee must notify the District Engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the National Register of Historic Places (see 33 CFR 330.4(g)).

13. Notification.

(a) Timing: Where required by the terms of the NWP, the prospective permittee must notify the District Engineer with a Pre-Construction Notification (PCN) as early as possible and shall not begin the activity:

(1) Until notified by the District Engineer that the activity may proceed under the NWP with any special conditions imposed by the District or Division Engineer; or

(2) If notified by the District or Division Engineer that an individual permit is required; or

(3) Unless 30 days (or 45 days for NWP 26 only) have passed from the District Engineer's receipt of the notification and the prospective permittee has not received notice from the District or Division Engineer. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Notification: The notification must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) Brief description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s) or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity; and

(4) For NWPs 14, 18, 21, 26, 29, 34, and 38, the PCN must also include a delineation of affected special aquatic sites, including wetlands (see paragraph 13(f));

(5) For NWP 21--Surface Coal Mining Activities, the PCN must include an OSM or state approved mitigation plan.

(6) For NWP 29--Single-Family Housing, the PCN must also include:

(i) Any past use of this NWP by the individual permittee and/or the permitee's spouse;

(ii) A statement that the single-family housing activity is for a personal residence of the permittee;

(iii) A description of the entire parcel, including its size, and a delineation of wetlands. For the purpose of this NWP, parcels of land measuring 0.5 acre or less will not require a formal on-site delineation. However, the applicant shall provide an indication of where the wetlands are and the amount of wetlands that exists on the property. For parcels greater than 0.5 acre in size, a formal wetland delineation must be prepared in accordance with the current method required by the Corps. (See paragraph 13(f));

(iv) A written description of all land (including, if available, legal descriptions) owned by the prospective permittee and/or the prospective permittee's spouse, within a one mile radius of the parcel, in any form of ownership (including any land owned as a partner, corporation, joint tenant, co-tenant, or as a tenant-by-the-entirety) and any land on which a purchase and sale agreement or other contract for sale or purchase has been executed;

(7) For NWP 31--Maintenance of Existing Flood Control Projects, the prospective permittee must either notify the District Engineer with a Pre-Construction Notification (PCN) prior to each maintenance activity or submit a five year (or less) maintenance plan. In addition, the PCN must include all of the following:

(i) Sufficient baseline information so as to identify the approved channel depths and configurations and existing facilities. Minor deviations are authorized, provided that the approved flood control protection or drainage is not increased;

(ii) A delineation of any affected special aquatic sites, including wetlands; and,

(iii) Location of the dredged material disposal site.

(8) For NWP 33--Temporary Construction, Access, and Dewatering, the PCN must also include a restoration plan of reasonable measures to avoid and minimize adverse effects to aquatic resources.

(c) Form of Notification: The standard individual permit application form (Form ENG 4345) may be used as the notification but must clearly indicate that it is a PCN and must include all of the information required in (b) (1)-(7) of General Condition 13. A letter may also be used.

(d) District Engineer's Decision: In reviewing the pre-construction notification for the proposed activity, the District Engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. The prospective permittee may, optionally, submit a proposed mitigation plan with the pre-construction notification to expedite the process and the District Engineer will consider any optional mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed work are minimal. If the District Engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects are minimal, the District Engineer will notify the permittee and include any conditions the DE deems necessary.

Any mitigation proposal must be approved by the District Engineer prior to commencing work. If the prospective permittee elects to submit a mitigation plan, the District Engineer will expeditiously review the proposed mitigation plan, but will not commence a second 30-day (or 45-day for NWP 26) notification procedure. If the net adverse effects of the project (with the mitigation proposal) are determined by the District Engineer to be minimal, the District Engineer will provide a timely written response to the applicant stating that the project can proceed under the terms and conditions of the nationwide permit.

If the District Engineer determines that the adverse effects of the proposed work are more than minimal, then he will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submitting a mitigation proposal that would reduce the adverse effects to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions.

(e) Agency Coordination: The District Engineer will consider any comments from Federal and State agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(i) For NWP 14, 21, 26 (between 1 and 3 acres of impact) , 29, 33, 37, and 38. The District Engineer will, upon receipt of a notification, provide immediately, e.g., facsimile transmission, overnight mail or other expeditious manner, a copy to the appropriate offices of the Fish and Wildlife Service, State natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO), and, if appropriate, the National Marine Fisheries Service. With the exception of NWP 37, these agencies will then have 5 calendar days from the date the material is transmitted to telephone or fax the District Engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the District Engineer will wait an additional 10 calendar days (16 calendar days for NWP 26 PCNs) before making a decision on the notification. The District Engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency. The District Engineer will indicate in the administrative record associated with each notification that the resource agencies' concerns were considered. Applicants are encouraged to provide the Corps multiple copies of notifications to expedite agency notification.

(ii) Optional Agency Coordination. For NWPs 5, 7, 12, 13, 17, 18, 27, 31, and 34, where a Regional Administrator of EPA, a Regional Director of USFWS, or a Regional Director of NMFS has formally requested general notification from the District Engineer for the activities covered by any of these NWPs, the Corps will provide the requesting agency with notification on the particular NWPs. However, where the agencies have a record of not generally submitting substantive comments on activities covered by any of these NWPs, the Corps district may discontinue providing notification to those regional agency offices. The District Engineer will coordinate with the resources agencies to identify which activities involving a PCN that the agencies will provide substantive comments to the Corps. The District Engineer may also request comments from the agencies on a case by case basis when the District Engineer determines that such comments would assist the Corps in reaching a decision whether effects are more than minimal either individually or cumulatively.

(iii) Optional Agency Coordination, 401 Denial. For NWP 26 only, where the state has denied its 401 water quality certification for activities with less than 1 acre of wetland impact, the EPA regional administrator may request agency coordination of PCNs between 1/3 and 1 acre. The request may only include acreage limitations within the 1/3 to 1 acre range for which the state has denied water quality certification. In cases where the EPA has requested coordination of projects as described here, the Corps will forward the PCN to EPA only. The PCN will then be forwarded to the Fish and Wildlife Service and the National Marine Fisheries Service by EPA under agreements among those agencies. Any agency receiving the PCN will be bound by the EPA timeframes for providing comments to the Corps.

(f) Wetlands Delineations: Wetland delineations must be prepared in accordance with the current method required by the Corps. For NWP 29 see paragraph (b)(6)(iii) for parcels less than 0.5 acres in size. The permittee may ask the Corps to delineate the special aquatic site. There may be some delay if the Corps does the delineation. Furthermore, the 30-day period (45 days for NWP 26) will not start until the wetland delineation has been completed and submitted to the Corps, where appropriate.

(g) Mitigation: Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to:

(i) To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of the overall project purposes;

(ii) To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contributions to wetland trust funds, "in lieu fees" to organizations such as The Nature Conservancy, state or county natural resource management agencies, where such fees contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: Reducing the size of the project; establishing wetland or upland buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address wetland impacts, such as functions and values, and cannot be simply used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the

NWPs (e.g., for NWP 26, 5 acres of wetlands cannot be created to change a 6-acre loss of wetlands to a 1 acre loss; however, 2 created acres can be used to reduce the impacts of a 3-acre loss.).

14. Compliance Certification. Every permittee who has received a Nationwide permit verification from the Corps will submit a signed certification regarding the completed work and any required mitigation. The certification will be forwarded by the Corps with the authorization letter and will include: a. A statement that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions; b. A statement that any required mitigation was completed in accordance with the permit conditions; c. The signature of the permittee certifying the completion of the work and mitigation.

15. Multiple Use of Nationwide Permits. In any case where any NWP number 12 through 40 is combined with any other NWP number 12 through 40, as part of a single and complete project, the permittee must notify the District Engineer in accordance with paragraphs a, b, and c on the "Notification" General Condition number 13. Any NWP number 1 through 11 may be combined with any other NWP without notification to the Corps, unless notification is otherwise required by the terms of the NWPs. As provided at 33 CFR 330.6(c) two or more different NWPs can be combined to authorize a single and complete project. However, the same NWP cannot be used more than once for a single and complete project.

SECTION 404 ONLY CONDITIONS

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material into waters of the U.S., and must be followed in order for authorization by the NWPs to be valid:

1. Water Supply Intakes. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

2. Shellfish Production. No discharge of dredged or fill material may occur in areas of concentrated shellfish production, unless the discharge is directly related to a shellfish harvesting activity authorized by NWP 4.

3. Suitable Material. No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.,) and material discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

4. Mitigation. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e., on-site), unless the District Engineer approves a compensation plan that the District Engineer determines is more beneficial to the environment than on-site minimization or avoidance measures.

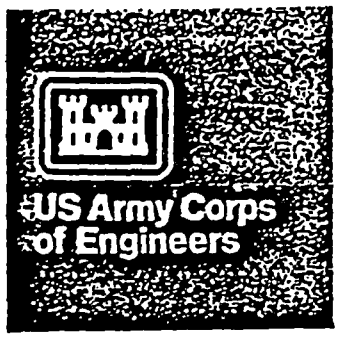
5. Spawning Areas. Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

6. Obstruction of High Flows. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

7. Adverse Effects From Impoundments. If the discharge creates an impoundment of water, adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

8. Waterfowl Breeding Areas. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

9. Removal of Temporary Fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.



WETLANDS RESEARCH PROGRAM

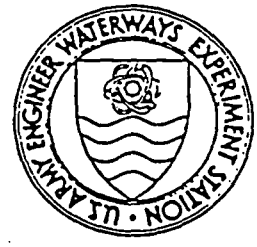
TECHNICAL REPORT Y-87-1

CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL

by

Environmental Laboratory

DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
PO Box 631, Vicksburg, Mississippi 39180-0631



January 1987
Final Report

Approved For Public Release; Distribution Unlimited

Prepared for DEPARTMENT OF THE ARMY
US Army Corps of Engineers
Washington, DC 20314-1000

A-20

PART II: TECHNICAL GUIDELINES

24. The interaction of hydrology, vegetation, and soil results in the development of characteristics unique to wetlands. Therefore, the following technical guideline for wetlands is based on these three parameters, and diagnostic environmental characteristics used in applying the technical guideline are represented by various indicators of these parameters.

25. Because wetlands may be bordered by both wetter areas (aquatic habitats) and by drier areas (nonwetlands), guidelines are presented for wetlands, deepwater aquatic habitats, and nonwetlands. However, procedures for applying the technical guidelines for deepwater aquatic habitats and nonwetlands are not included in the manual.

Wetlands

26. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for the identification and delineation of wetlands:

a. Definition. The CE (Federal Register 1982) and the EPA (Federal Register 1980) jointly define wetlands as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

b. Diagnostic environmental characteristics. Wetlands have the following general diagnostic environmental characteristics:

(1) Vegetation. The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described in a above. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions.* Indicators of vegetation associated with wetlands are listed in paragraph 35.

---

* Species (e.g. *Acer rubrum*) having broad ecological tolerances occur in both wetlands and nonwetlands.

(2) Soil. Soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions. Indicators of soils developed under reducing conditions are listed in paragraphs 44 and 45.

(3) Hydrology. The area is inundated either permanently or periodically at mean water depths ≤6.6 ft, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation.* Indicators of hydrologic conditions that occur in wetlands are listed in paragraph 49.

c. Technical approach for the identification and delineation of wetlands. Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination.

Deepwater Aquatic Habitats

27. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for deepwater aquatic habitats:

a. Definition. Deepwater aquatic habitats are areas that are permanently inundated at mean annual water depths >6.6 ft or permanently inundated areas ≤6.6 ft in depth that do not support rooted-emergent or woody plant species.**

b. Diagnostic environmental characteristics. Deepwater aquatic habitats have the following diagnostic environmental characteristics:

(1) Vegetation. No rooted-emergent or woody plant species are present in these permanently inundated areas.

(2) Soil. The substrate technically is not defined as a soil if the mean water depth is >6.6 ft or if it will not support rooted emergent or woody plants.

(3) Hydrology. The area is permanently inundated at mean water depths >6.6 ft.

c. Technical approach for the identification and delineation of deepwater aquatic habitats. When any one of the diagnostic characteristics identified in b above is present, the area is a deepwater aquatic habitat.

---

* The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and nontidal situations.

** Areas ≤6.6 ft mean annual depth that support only submergent aquatic plants are vegetated shallows, not wetlands.

Nonwetlands

28. The following definition, diagnostic environmental characteristics, and technical approach comprise a guideline for the identification and delineation of nonwetlands:

a. Definition. Nonwetlands include uplands and lowland areas that are neither deepwater aquatic habitats, wetlands, nor other special aquatic sites. They are seldom or never inundated, or if frequently inundated, they have saturated soils for only brief periods during the growing season, and, if vegetated, they normally support a prevalence of vegetation typically adapted for life only in aerobic soil conditions.

b. Diagnostic environmental characteristics. Nonwetlands have the following general diagnostic environmental characteristics:

(1) Vegetation. The prevalent vegetation consists of plant species that are typically adapted for life only in aerobic soils. These mesophytic and/or xerophytic macrophytes cannot persist in predominantly anaerobic soil conditions.*

(2) Soil. Soils, when present, are not classified as hydric, and possess characteristics associated with aerobic conditions.

(3) Hydrology. Although the soil may be inundated or saturated by surface water or ground water periodically during the growing season of the prevalent vegetation, the average annual duration of inundation or soil saturation does not preclude the occurrence of plant species typically adapted for life in aerobic soil conditions.

c. Technical approach for the identification and delineation of nonwetlands. When any one of the diagnostic characteristics identified in b above is present, the area is a nonwetland.

---

* Some species, due to their broad ecological tolerances, occur in both wetlands and nonwetlands (e.g. *Acer rubrum*).

Appendix B

Flood Insurance Studies

The following pages were obtained from the Flood Plain Permits Section of the Iowa Department of Natural Resources in Des Moines. To determine if a city or county is in the National Flood Insurance Program (NFIP), first find the name under "Community Name". (If the name is not on the list, then the city or county is not in the NFIP.)

Then go to the column "Program Phase" to find the status of the community in the NFIP.

"Not Part." means the community is currently not participating, so there are no NFIP requirements.

"Suspended" means they were at one time participating but have been suspended from the NFIP by the Federal Emergency Management Agency (FEMA), so there are no NFIP requirements.

"Emergency" is generally a short-term phase that means the community is participating but does not yet have full privileges to purchase flood insurance. Under this phase, the community's FIS requirements **must** be complied with. After a period of time in the Emergency phase, the community is usually granted Regular phase.

"Regular" means the community has a fully-accepted flood insurance program. Similar to the Emergency status, a Regular FIS **must** be complied with. There are two types of "Regular" Flood Insurance Studies as indicated in the column "Study Status":

1. "E. Conv." (which means Emergency Conversion), indicates that the community's FIS is non-detailed. In other words, the FIS does not have any detailed hydrology or hydraulics.
2. "Complete", means that the FIS has detailed hydrology and hydraulics.

For any questions concerning compliance with NFIP, please contact DNR at 515/281-8942. The list of FIS status is updated regularly by DNR, so check with them to ensure the most recent "Program Phase" and "Study Status".

The information provided on the status listing includes the following:

- **Community Name** - List of communities which are identified as having a special flood hazard area (SFHA) by the NFIP. Communities not listed here are not considered by the NFIP to have a SFHA.
- **ID Number** - Community identification number assigned by the NFIP. An alphabetic suffix at the end of the number indicates whether the currently effective map for the community is a revision of an earlier map (e.g., "A" normally indicates a first edition "B" a first revision, etc.). This number and suffix, if any, must be used when ordering maps, writing insurance policies, etc. The suffix "P" indicates that the community's map is printed on one or more Z-fold map panels (like road maps). This permits the revision of individual panels rather than the entire map. Consequently, each individual map panel could have a different revision suffix.
- **Program Phase** - Indicates if the community is participating in the NFIP and, if so, under what program (Regular or Emergency). The term "Not Part." in this column indicates that a community was identified as having a SFHA but is not participating in the program. "Suspended" indicates that participation of the community was terminated.
- **Orig ID Date** - The original date the community was identified as having a special flood hazard area.
- **Last Rev Date** - The date of the last revision of the community's map. A "*" indicates that the community is minimally flood prone and the map was rescinded. Such a community is classified as having No Special Flood Hazard Area (NSFHA) and no map is available. The community may still be participating in the program.
- **Orig Ent Date** - Date community originally joined the NFIP.
- **Study Status** - Indicates status of detailed flood insurance study for the community. The term "E. Conv." indicates that the community was converted to the Regular program without a detailed study and that the flood hazard boundary map was converted into a Flood Insurance Rate Map (FIRM).
- **FIRM Date** - Effective date of the community's FIRM.
- **FPM Approval** - Indicates if the Department of Natural Resources has delegated permitting authority to the community. A number in this column is that of the approval document for the delegation.

SS310002 — DEPARTMENT OF NATURAL RESOURCES — NATIONAL FLOOD INSURANCE PROGRAM — DATE 04/07/94 — PAGE 1

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG ENT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
ACKLEY	FRANKLIN	190386A	1800	NOT PART.	07/16/76	04/17/79					02	05	3
ADAIR	ADAIR	190537	883	REGULAR	08/22/75	06/10/80*	08/12/76				14	02	5
ADEL	DALLAS	190103K	2846	REGULAR	06/28/74	12/15/80	07/30/75	E. CONV.	08/04/87		11	03	5
AGENCY	WAPELLO	190538	857	REGULAR	09/05/75	06/30/80*	09/02/76				15	03	4
AINSWORTH	WASHINGTON	190525A	847	REGULAR	09/19/75	09/01/87	07/23/84	E. CONV.	09/01/87		10	05	1
AKRON	PLYMOUTH	190223C	1517	REGULAR	03/22/74	08/01/86	11/14/74	E. CONV.	08/01/86		04	01	6
ALBIA	MONROE	190541	4184	REGULAR	09/19/75	06/10/80*	09/24/76				16	03	4
ALBION	MARSHALL	190542	739	NOT PART.	04/23/76						08	05	3
ALBURNETT	LINN	190692A	411	SUSPENDED	09/19/75	08/01/87	03/02/76		08/01/87		10	05	2
ALDEN	HARDIN	190138A	953	NOT PART.	06/21/74	12/26/75					06	05	3
ALGONA	KOSSUTH	190180X	5288	REGULAR	05/03/74	06/01/83	07/16/74	COMPLETE	06/01/83	83-12	02	03	6
ALLAMAKEE COUNTY		190005A	7292	NOT PART.	06/03/77						01		2
ALTA VISTA	CHICKASAW	190065A	314	REGULAR	12/20/74	08/01/86	03/03/76	E. CONV.	08/01/86		07	06	3
ALTON	SIOUX	190508A	986	REGULAR	04/16/76	08/05/85	03/11/76	E. CONV.	08/05/85		03	01	6
ALTOONA	POLK	190546	5764	REGULAR	09/26/75	02/20/79*	11/10/82				11	03	4
ALVORD	LYON	190197B	246	SUSPENDED	09/13/74	08/18/85	11/07/75		08/18/85		03	01	6
AMES	STORY	190254X	45775	REGULAR	06/02/74	01/02/81	07/25/74	COMPLETE	01/02/81	80-01	11	04	5
ANAMOSA	JONES	190174B	4858	REGULAR	06/28/74	08/19/87	07/25/75	E. CONV.	08/19/87		10	06	2
ANITA	CASS	190048B	1153	REGULAR	05/03/74	06/17/86	04/11/75	E. CONV.	08/17/86		13	02	5
ANKENY	POLK	190226X	15429	REGULAR	04/05/74	05/16/83	08/13/75	COMPLETE	05/16/83	83-08	11	03	4
ANTHON	WOODBURY	190286B	667	REGULAR	01/23/74	09/18/85	05/20/76	E. CONV.	09/18/85		04	01	6
APLINGTON	BUTLER	190335	1027	NOT PART.	06/25/76						07	05	3
ARCADIA	CARROLL	190694	454	REGULAR	09/26/75	06/10/80*	09/03/76				12	01	3
AREDALE	BUTLER	190033A	88	REGULAR	01/17/75	08/19/86	11/03/75	E. CONV.	08/19/86		07	05	3
ARION	CRAWFORD	190092A	207	NOT PART.	09/06/74	05/14/76					12	01	3
ARTHUR	IDA	190686A	288	REGULAR	06/25/76	09/01/87	03/25/77	E. CONV.	09/01/87		04	01	6
ASHTON	OSCEOLA	190217	441	NOT PART.	07/11/75						02	01	6
ATALISSA	MUSCATINE	190211	360	REGULAR	11/08/74	06/30/80*	10/22/75				08	05	1
ATLANTIC	CASS	190049X	7769	REGULAR	05/03/74	08/05/86	07/08/75	COMPLETE	08/05/86	86-02	13	02	5
AUDUBON	AUDUBON	190011X	2641	REGULAR	05/03/74	05/17/89	09/04/74	COMPLETE	08/15/79	79-08	12	02	5
AURELIA	CHEROKEE	190548A	1143	REGULAR	04/16/76	07/01/87	10/10/79	E. CONV.	07/01/87		04	01	6
AVOCA	POTTAWATTAMIE	190233X	1650	REGULAR	01/23/74	12/18/80	05/20/74	COMPLETE	12/18/80	80-15	13	02	5
BAGLEY	GUTHRIE	190700A	370	SUSPENDED	06/13/76	01/01/87	04/18/85		01/01/87		12	03	5
BALDWIN	JACKSON	190428B	196	SUSPENDED	06/25/76	06/18/87	08/21/79		06/18/87		08	06	2
BANCROFT	KOSSUTH	190550A	1062	REGULAR	06/28/75	09/01/87	08/07/75	E. CONV.	09/01/87		02	03	6
BARNUM	WEBSTER	190528	198	NOT PART.	11/05/76						05	03	6
BATTLE CREEK	IDA	190423	810	NOT PART.	09/26/75						04	01	6
BEACON	MAHASKA	190452	530	NOT PART.	09/19/75						15	03	4
BEAVER	BOONE	190322	85	NOT PART.	10/28/76						11	03	5
BEDFORD	TAYLOR	190263B	1892	REGULAR	02/01/74	07/03/86	07/08/75	E. CONV.	07/03/86		14	02	5
BELLE PLAINE	BENTON	190018B	2803	REGULAR	04/05/74	08/01/86	05/09/75	E. CONV.	08/01/86		10	05	
BELLEVUE	JACKSON	190188X	2450	REGULAR	03/29/74	10/15/82	04/21/75	COMPLETE	10/15/82	82-14	08	06	
BELMOND	WRIGHT	190303A	2508	NOT PART.	05/03/74	08/22/75					05	05	
BENNETT	CEDAR	190051A	458	REGULAR	12/27/74	09/04/85	04/24/75	E. CONV.	09/04/85		10	05	1
BENTON COUNTY		190845X	8325	NOT PART.	05/24/77						10		1
BERTRAM	LINN	190438	216	NOT PART.	07/02/76						10	05	2
BETTENDORF	SCOTT	190240X	27381	REGULAR	02/01/74	02/17/88	02/04/72	COMPLETE	06/01/78	78-06	08	06	1
BEVINGTON	MADISON	190273X	60	REGULAR	06/27/78	05/01/87	11/30/76	E. CONV.	05/01/87		11	03	5
BLACK HAWK COUNTY		190535X	15837	REGULAR	10/25/77	11/17/82	10/20/75	COMPLETE	11/17/82	83-02	07		3
BLAIRSTOWN	BENTON	190320	695	NOT PART.	09/19/75						10	05	1
BLOCKTON	TAYLOR	190517	280	NOT PART.	09/26/75						14	02	5

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG ENT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
BONAPARTE	VAN BUREN	190266B	489	REGULAR	01/09/74	07/02/87	01/14/76	E. CONV.	07/02/87		15	03	1
BONDURANT	POLK	190707A	1283	REGULAR	09/05/75	04/02/80	02/06/78	E. CONV.	04/02/80		11	03	4
BOONE COUNTY		190646K	8815	EMERGENCY	05/09/78		11/09/83				11		5
BRADGATE	HUMBOLDT	190420	181	EMERGENCY	06/28/78		09/02/83				05	03	6
BRANDON	BUCHANAN	190328	337	EMERGENCY	10/20/78		09/16/83				07	05	2
BRAYTON	AUDUBON	190920A	170	REGULAR	10/20/78	08/19/85	06/09/75	E. CONV.	08/19/85		12	02	5
BREMER COUNTY		190647K	8896	REGULAR	05/10/77	07/16/80	08/12/80	COMPLETE	07/16/80	80-06	07		3
BRONSON	WOODBURY	190287B	289	REGULAR	08/30/74	09/01/86	09/04/75	E. CONV.	09/01/86		04	01	6
BROOKLYN	POWESHIEK	190489A	1509	SUSPENDED	04/18/75	07/17/88	05/04/76		07/17/88		06	05	1
BRUNSVILLE	PLYMOUTH	190478	140	NOT PART.	07/02/76						04	01	6
BUCHANAN COUNTY		190648K	10038	REGULAR	06/07/77	09/01/81	12/17/80	E. CONV.	09/01/81		07		3
BUCK GROVE	CRAWFORD	190093	84	NOT PART.	11/20/74						12	01	6
BUENA VISTA COUNTY		190649K	6580	NOT PART.	11/15/77						03		6
BUFFALO	SCOTT	190261K	1441	REGULAR	03/01/74	09/17/80	09/26/74	COMPLETE	09/17/80	80-07	09	06	1
BURLINGTON	DES MOINES	190114K	29529	REGULAR	06/17/74	04/17/85	04/15/75	COMPLETE	07/02/81	81-09	16	04	1
BUTLER COUNTY		190650K	7843	NOT PART.	09/06/77						07		3
CALUMET	OBRIEN	190712A	313	REGULAR	09/15/78	09/01/87	09/23/76	E. CONV.	09/01/87		03	01	6
CAMANCHE	CLINTON	190068K	4725	REGULAR	01/23/79	12/18/84	02/08/73	COMPLETE	12/18/84	84-03	09	06	2
CAMBRIDGE	STORY	190255B	732	SUSPENDED	06/18/74	06/15/81	07/29/74	COMPLETE	06/15/81	77-09	11	04	5
CARBON	ADAMS	190001	110	NOT PART.	06/25/76						14	02	5
CARLISLE	WARREN	190274K	3072	REGULAR	08/07/74	08/04/87	12/17/74	E. CONV.	08/04/87		11	03	5
CARROLL	CARROLL	190041K	9705	REGULAR	03/13/78	03/19/80	12/13/74	COMPLETE	03/19/80	80-02	12	03	5
CARROLL COUNTY		190039K	7815	REGULAR	06/17/77	08/17/88	04/24/75	E. CONV.	08/17/88		12		5
CARSON	POTTAWATTAMIE	190234B	718	REGULAR	04/09/74	09/04/85	07/29/75	E. CONV.	09/04/85		13	02	5
CARTER LAKE	POTTAWATTAMIE	190492A	3438	REGULAR	09/15/75	08/08/78	12/27/77	E. CONV.	08/08/78		13	01	5
CASCADE	DUBUQUE	190117K	1812	REGULAR	12/17/73	10/16/92	11/20/76	COMPLETE	04/02/79	79-03	08	06	2
CASEY	GUTHRIE	190184B	473	REGULAR	05/17/74	02/01/87	03/12/75	E. CONV.	02/01/87		12	03	5
CASS COUNTY		190652K	5717	REGULAR	08/16/77	09/01/86	08/25/75	E. CONV.	09/01/86		13		5
CASTANA	MONONA	190462	228	NOT PART.	08/29/75						04	01	6
CEDAR COUNTY		190050B	6385	REGULAR	06/07/77	08/05/85	07/16/81	E. CONV.	08/05/85		10		2
CEDAR FALLS	BLACK HAWK	190017K	36322	REGULAR	04/12/74	02/01/85	07/23/71	COMPLETE	02/01/85	85-03	07	05	3
CEDAR RAPIDS	LINN	190167K	110243	REGULAR	08/02/74	03/18/91	08/13/71	COMPLETE	12/18/82	82-10	10	05	2
CENTER JUNCTION	JONES	190433	182	REGULAR	06/25/76	08/19/86*	02/03/81				10	06	2
CENTER POINT	LINN	190439K	1891	REGULAR	10/20/76	07/05/82	10/27/77	COMPLETE	07/05/82	83-05	10	05	2
CENTERVILLE	APPANOOSE	190009B	6558	REGULAR	03/22/74	07/02/87	07/22/75	E. CONV.	07/02/87		15	02	4
CENTRAL CITY	LINN	190188K	1067	REGULAR	04/23/76	12/15/82	01/08/76	COMPLETE	12/15/82	82-17	10	06	2
CERRO GORDO COUNTY		190653K	8218	NOT PART.	06/07/77						02		3
CHARITON	LUCAS	190185B	4867	REGULAR	06/14/74	02/01/87	10/18/74	E. CONV.	02/01/87		15	02	4
CHARLES CITY	FLOYD	190128A	8778	REGULAR	02/02/77		03/03/72	COMPLETE	02/02/77	77-01	02	05	3
CHARLOTTE	CLINTON	190087A	442	REGULAR	06/06/78	09/04/85	11/10/77	E. CONV.	09/04/85		09	06	2
CHARTER OAK	CRAWFORD	190094A	615	REGULAR	06/04/78	04/30/88	03/09/78	E. CONV.	04/30/88		12	01	6
CHATSWORTH	SIOUX	190509A	110	NOT PART.	08/13/78	09/19/78					03	01	5
CHELSEA	TAMA	190261K	378	REGULAR	08/16/74	12/16/80	07/15/75	COMPLETE	12/16/80	81-03	06	05	3
CHEROKEE	CHEROKEE	190063K	7004	REGULAR	03/28/74	01/02/81	01/22/75	COMPLETE	01/02/81	80-01	04	01	6
CHEROKEE COUNTY		190654A	6338	NOT PART.	05/06/77						04		6
CHICKASAW COUNTY		190655K	7372	NOT PART.	05/24/77						07		3
CHILLICOTHE	WAPELLO	190268	131	NOT PART.	11/08/74						15	03	4
CHURDAN	GREENE	190385	540	EMERGENCY	08/29/75		12/27/83				12	03	5
CLARINDA	PAGE	190219K	5456	REGULAR	06/28/74	07/02/81	04/14/75	COMPLETE	07/02/81	81-10	13	02	5
CLARKSVILLE	BUTLER	190336K	1424	REGULAR	09/19/75	09/06/89	10/28/85	COMPLETE	09/06/89		07	05	3
CLAY COUNTY		190857K	5648	NOT PART.	06/07/77						03		6

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG ENT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
CLAYTON	CLAYTON	190072K	68	REGULAR	08/23/74	03/18/88	02/24/75	COMPLETE	03/18/88		01	06	2
CLAYTON COUNTY		190858K	10172	REGULAR	01/31/78	05/01/90	05/03/78	E. CONV.	05/01/90		01		2
CLEAR LAKE	CERRO GORDO	190059K	7458	REGULAR	05/24/74	08/04/87	08/07/75	COMPLETE	08/04/87	87-03	02	05	3
CLEMONS	MARSHALL	190201A	175	REGULAR	11/05/76	04/01/92	11/18/81	E. CONV.	04/01/92		06	05	3
CLERMONT	FAYETTE	190374A	602	REGULAR	11/05/76	03/01/86	09/14/83	E. CONV.	03/01/86		07	06	2
CLINTON	CLINTON	190088K	32828	REGULAR	06/28/74	09/14/82	06/11/74	COMPLETE	09/17/80	80-11	09	06	2
CLINTON COUNTY		190859K	10564	REGULAR	08/09/77	09/01/90	07/02/75	E. CONV.	09/01/90		09		2
CLIVE	POLK	190488K	5906	REGULAR	10/01/76	10/16/92	08/25/77	COMPLETE	11/01/78	83-11	11	03	4
CLUTIER	TAMA	190514A	249	SUSPENDED	07/25/75	08/19/85	10/06/76		08/19/85		06	05	3
COGGON	LINN	190189K	639	REGULAR	06/21/74	07/16/84	05/09/75	COMPLETE	07/16/84	85-02	10	06	2
COLFAX	JASPER	190163B	2211	REGULAR	01/23/74	08/01/87	07/11/75	E. CONV.	08/01/87		11	04	4
COLUMBUS JUNCTION	LOUISA	190307K	1429	REGULAR	01/09/74	02/08/91	07/29/76	COMPLETE	02/08/91	93-04	16	05	1
CONRAD	GRUNDY	190401	1133	NOT PART.	04/16/76						07	05	3
CONWAY	TAYLOR	190518	93	NOT PART.	07/02/76						14	02	5
COON RAPIDS	CARROLL	190042B	1448	REGULAR	05/03/74	04/30/88	04/11/75	E. CONV.	04/30/88		12	03	5
CORALVILLE	JOHNSON	190188K	7687	REGULAR	06/14/74	09/29/78	08/23/74	COMPLETE	09/29/78	78-11	10	05	1
CORNING	ADAMS	190002B	1930	REGULAR	06/21/74	08/01/86	06/25/75	E. CONV.	08/01/86		14	02	5
CORRECTIONVILLE	WOODBURY	190288K	935	REGULAR	02/22/74	08/15/90	03/20/75	COMPLETE	08/15/90		04	01	6
CORWITH	HANCOCK	190407A	480	REGULAR	10/22/76	07/01/81	10/11/89	E. CONV.	07/01/81		02	03	3
COULTER	FRANKLIN	190388	284	NOT PART.	08/13/76						02	05	3
COUNCIL BLUFFS	POTTAWATTAMIE	190235K	56449	REGULAR	06/28/74	02/04/87	04/11/73	COMPLETE	08/15/78	78-07	13	01	5
CRAWFORD COUNTY		190091K	7903	REGULAR	06/07/77	09/01/86	03/16/77	E. CONV.	09/01/86		12		6
CRESCENT	POTTAWATTAMIE	190723A	847	SUSPENDED	09/26/75	06/01/82	02/01/77	COMPLETE	06/01/82		13	01	5
CRESTON	UNION	190264K	8429	REGULAR	06/28/74	04/04/83	10/18/74	COMPLETE	04/04/83	83-10	14	02	5
CROMWELL	UNION	190519	187	NOT PART.	06/25/76						14	02	5
CUMBERLAND	CASS	190345	351	NOT PART.	10/29/76						13	02	5
CUSHING	WOODBURY	190289B	270	SUSPENDED	08/09/74	09/18/85	04/26/78		09/18/85		04	01	6
DAKOTA CITY	HUMBOLDT	190421	1072	NOT PART.	11/08/74						05	03	6
DALLAS COUNTY		190860K	8930	EMERGENCY	10/25/77		12/14/82				11		5
DANBURY	WOODBURY	190290B	492	SUSPENDED	01/09/74	09/18/85	08/05/75		09/18/85		04	01	6
DAVENPORT	SCOTT	190242K	103264	REGULAR	06/21/74	11/04/82	07/25/73	COMPLETE	03/01/78	78-03	09	06	1
DAVIS CITY	DECATUR	190109	327	NOT PART.	07/18/75						14	02	5
DAWSON	DALLAS	190358	229	NOT PART.	08/13/76						11	03	5
DAYTON	WEBSTER	190565	841	NOT PART.	11/05/76						05	03	6
DECORAH	WINNESHIEK	190532	7881	NOT PART.	12/10/76						01	06	2
DEDHAM	CARROLL	190043A	321	REGULAR	11/01/74	09/01/86	07/07/75	E. CONV.	09/01/86		12	03	5
DEFIANCE	SHELBY	190246A	383	REGULAR	12/20/74	08/19/86	10/27/76	E. CONV.	08/19/86		13	02	5
DELAWARE COUNTY		190863K	9931	NOT PART.	07/22/80						08		2
DELMI	DELAWARE	190566	511	NOT PART.	03/19/76						08	06	2
DELOIT	CRAWFORD	190095B	345	REGULAR	08/30/74	08/21/86	10/04/77	E. CONV.	08/01/86		12	01	6
DENISON	CRAWFORD	190096K	6675	REGULAR	05/10/74	05/17/82	03/19/75	COMPLETE	05/17/82	82-07	12	01	6
DENVER	BREMER	190026K	1647	REGULAR	03/22/74	07/16/90	05/27/75	COMPLETE	07/16/90	90-07	07	05	3
DES MOINES	POLK	190227K	191003	REGULAR	08/06/74	07/15/88	09/06/74	COMPLETE	02/04/81	92-01	11	03	4
DES MOINES COUNTY		190113K	8844	REGULAR	05/17/77	02/17/82	07/20/93	COMPLETE	02/17/82	93-02	16		1
DESOTO	DALLAS	190359B	1035	REGULAR	08/26/75	08/27/85	09/01/79	E. CONV.	08/27/85		11	03	5
DIAGONAL	RINGGOLD	190501	362	NOT PART.	08/29/75						14	02	5
DICKINSON COUNTY		190864K	4319	EMERGENCY	05/10/77		11/01/93				03		6
DIKE	GRUNDY	190402A	987	REGULAR	07/25/75	08/18/86	08/17/76	E. CONV.	08/18/86		07	05	3
DONAHUE	SCOTT	190505A	269	REGULAR	03/19/76	05/01/90	02/10/88	E. CONV.	05/01/90		09	06	1
DOW CITY	CRAWFORD	190097B	616	REGULAR	05/31/74	09/01/86	08/25/76	E. CONV.	09/01/86		12	01	6
DOWS	WRIGHT	190305A	771	NOT PART.	06/21/74	12/26/75					05	05	3

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG EMT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
DUBUQUE	DUBUQUE	195180X	62321	REGULAR	05/15/70	09/06/89	04/02/71	COMPLETE	09/15/77	80-04	08	06	2
DUBUQUE COUNTY		195534X	18377	REGULAR	06/17/77	09/01/83	05/24/74	RESTUDY	09/01/83	83-18	08		2
DUMONT	BUTLER	190036B	618	REGULAR	05/24/74	08/01/86	07/31/75	E. CONV.	08/01/86		07	05	3
DUNDEE	DELAWARE	190363A	184	REGULAR	07/30/76	08/01/86	11/30/77	E. CONV.	08/01/86		08	06	2
DUNKERTON	BLACK HAWK	190018X	713	REGULAR	03/22/74	01/16/80	04/03/75	COMPLETE	01/16/80	80-08	07	06	3
DUNLAP	HARRISON	190144B	1374	REGULAR	05/17/74	09/18/85	06/26/75	E. CONV.	09/18/85		13	01	5
DURANGO	DUBUQUE	190119X	41	REGULAR	10/17/78	07/16/81	04/10/74	COMPLETE	07/16/81	81-13	08	06	2
DURANT	CEDAR	190022	1583	REGULAR	11/05/75	08/11/78*	11/05/75				10	05	1
DYERSVILLE	DUBUQUE	190120X	3825	REGULAR	06/26/74	11/19/80	12/29/72	RESTUDY	12/01/77	78-02	08	06	2
EARLHAM	MADISON	190670A	1140	REGULAR	08/06/76	09/30/88	09/06/77	E. CONV.	09/30/88		11	03	5
EARLING	SHELBY	190247B	820	REGULAR	05/03/74	09/01/86	07/18/75	E. CONV.	09/01/86		13	05	5
EARLY	SAC	190672A	670	NOT PART.	10/29/76	08/24/77					12	01	6
EAST PERU	MADISON	190450A	126	REGULAR	07/02/76	02/01/87	04/28/77	E. CONV.	02/01/87		11	03	5
EDDYVILLE	MONROE	190270B	1116	REGULAR	06/28/74	08/01/87	10/20/75	E. CONV.	08/01/87		15	03	4
ELBERON	TAMA	190728A	184	SUSPENDED	09/28/75	09/18/85	10/29/76		09/18/85		08	05	3
ELDON	WAPELLO	190271D	1255	REGULAR	12/17/73	05/01/87	01/27/75	E. CONV.	05/01/87		15	03	4
ELDORA	HARDIN	190138B	3063	REGULAR	06/28/74	05/01/87	04/14/75	E. CONV.	05/01/87		08	05	3
ELDRIDGE	SCOTT	190674A	3279	REGULAR	08/06/76	09/01/91	10/30/80	E. CONV.	09/01/91		08	06	1
ELGIN	FAYETTE	190125X	702	REGULAR	02/08/74	08/18/91	08/18/75	COMPLETE	08/04/87		07	08	2
ELK RUN HEIGHTS	BLACK HAWK	190018X	1186	REGULAR	01/18/74	08/01/83	06/12/74	COMPLETE	08/01/83	83-13	07	05	3
ELKADER	CLAYTON	190073X	1688	REGULAR	02/08/74	09/29/78	10/03/74	COMPLETE	09/29/78	78-08	01	06	2
ELKPORT	CLAYTON	190074A	98	REGULAR	06/22/75	08/01/86	12/24/74	E. CONV.	08/01/86		01	06	2
ELLIOTT	MONTGOMERY	190209X	483	REGULAR	06/25/76	05/17/89	12/26/75	COMPLETE	05/17/89	90-03	13	02	5
ELLSWORTH	HAMILTON	190138A	480	REGULAR	12/13/74	08/01/87	12/29/76	E. CONV.	08/01/87		05	04	3
ELMA	HOWARD	190416A	714	SUSPENDED	09/18/75	06/01/86	05/23/75		08/01/86		01	06	3
ELY	LINN	190440X	425	REGULAR	07/30/76	02/17/83	04/21/81	COMPLETE	02/17/83		10	05	2
EMERSON	MILLS	190202X	502	REGULAR	12/13/74	12/17/87	07/28/75	COMPLETE	04/03/84	84-03	13	02	5
EMMET COUNTY		190865X	30	REGULAR	05/17/77	09/30/88	04/11/78	E. CONV.	09/30/88		03		6
EMMETSBURG	PALO ALTO	190221X	4821	REGULAR	06/28/74	09/30/93	04/28/75	COMPLETE	07/16/81		03	03	6
EPWORTH	DUBUQUE	190676	1380	REGULAR	08/22/75	07/12/77*	08/04/76				08	06	2
ESTHERVILLE	EMMET	190124X	7618	REGULAR	03/29/74	10/14/77	01/15/74	COMPLETE	10/14/77	77-04	03	03	6
EVANSDALE	BLACK HAWK	190020X	4788	REGULAR	05/17/74	04/18/93	08/28/73	COMPLETE	11/02/77	85-01	07	05	3
EVERLY	CLAY	190356	548	REGULAR	08/18/75	02/20/78*	03/31/77				03	01	6
EXIRA	AUDUBON	190013B	878	REGULAR	05/10/74	09/19/85	07/28/75	E. CONV.	09/18/85		12	02	8
FAIRBANK	BUCHANAN	190329A	980	REGULAR	07/25/75	08/18/86	09/21/76	E. CONV.	08/19/86		07	06	2
FAIRFAX	LINN	190180X	683	REGULAR	05/03/74	09/19/84	01/20/78	COMPLETE	09/19/84	85-04	10	05	2
FAIRFIELD	JEFFERSON	190166X	9428	REGULAR	08/28/74	02/18/81	07/15/75	RESTUDY	02/18/81	81-07	15	04	1
FARMERSBURG	CLAYTON	190075A	276	REGULAR	11/01/74	08/18/86	10/06/75	E. CONV.	08/19/86		01	06	2
FARMINGTON	VAN BUREN	190267B	869	REGULAR	01/09/74	07/16/87	06/19/75	E. CONV.	07/16/87		15	03	1
FARNHAMVILLE	CALHOUN	190730A	461	REGULAR	03/28/78	07/01/91	09/18/90	E. CONV.	07/01/91		05	03	6
FAYETTE	FAYETTE	190376A	1515	REGULAR	05/28/76	09/01/87	04/27/78	E. CONV.	09/01/87		07	06	2
FAYETTE COUNTY		190866X	10744	REGULAR	08/18/77	07/01/91	11/27/90	E. CONV.	07/01/91		07		2
FENTON	KOSSUTH	190437	394	EMERGENCY	09/18/75		11/09/93				02	03	6
FERGUSON	MARSHALL	190457	173	NOT PART.	09/26/75						06	05	3
FERTILE	WORTH	190301A	372	SUSPENDED	12/27/74	08/04/87	03/19/76		08/04/87		02	05	3
FLOYD	FLOYD	190382	408	NOT PART.	03/18/76						02	05	3
FLOYD COUNTY		190127A	6883	NOT PART.	06/03/77						02		3
FONDA	POCAHONTAS	190483	863	NOT PART.	07/30/76						05	03	6
FOREST CITY	WINNEBAGO	190283X	4270	REGULAR	05/17/74	04/18/83	06/18/75	COMPLETE	01/02/81	81-02	02	05	3
FORT ATKINSON	WINNESHIEK	190284B	374	SUSPENDED	01/17/75	08/04/87	08/21/75		08/04/87		01	06	2
FORT DODGE	WEBSTER	195181A	29423	REGULAR	08/18/70	01/02/76	04/09/71	COMPLETE	04/09/71		05	03	6

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG EMT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
FORT MADISON	LEE	190184X	13520	REGULAR	03/01/74	05/03/82	04/11/74	COMPLETE	05/03/82	82-03	16	04	1
FRANKLIN COUNTY		190867X	6274	NOT PART.	05/22/79						02		3
FRASER	BOONE	190324	139	NOT PART.	07/30/76						11	03	5
FREDERICKSBURG	CHICKASAW	190068B	1075	REGULAR	05/03/74	09/29/88	10/14/75	E. CONV.	09/29/88		07	06	3
FREDERIKA	BREMER	190027X	223	REGULAR	11/22/74	07/16/90	12/07/90	COMPLETE	07/16/90		07	06	3
FREDONIA	LOUISA	190308X	224	REGULAR	02/14/75	02/06/91	08/04/93	COMPLETE	02/06/91		16	05	1
FREMONT COUNTY		190868X	4238	REGULAR	12/05/78	03/01/90	10/26/78	E. CONV.	03/01/90		13		5
FRUITLAND	MUSCATINE	190212	461	REGULAR	08/25/76	06/10/80*	06/06/75				09	06	1
GALVA	IDA	190424A	420	REGULAR	09/19/75	08/19/86	08/28/76	E. CONV.	08/19/86		04	01	8
GARBER	CLAYTON	190078B	140	REGULAR	08/30/74	08/01/88	03/07/75	E. CONV.	08/01/88		01	06	2
GARRISON	BENTON	190321	411	NOT PART.	08/08/75						10	05	1
GARWIN	TAMA	190515A	826	REGULAR	02/07/75	08/18/85	03/19/76	E. CONV.	08/19/85		06	05	3
GEORGE	LYON	190447A	1241	REGULAR	08/15/75	08/01/86	08/18/76	E. CONV.	08/01/86		03	01	6
GILBERT	STORY	190256B	805	REGULAR	08/07/74	01/01/87	04/08/75	E. CONV.	01/01/87		11	04	5
GILBERTVILLE	BLACK HAWK	190021B	740	REGULAR	03/22/74	08/01/78	04/17/75	E. CONV.	08/01/78		07	05	3
GILLETT GROVE	CLAY	190824A	93	NOT PART.	04/10/79						03	01	6
GLADBROOK	TAMA	190518A	870	REGULAR	07/25/75	09/04/85	06/30/76	E. CONV.	09/04/85		06	05	3
GLENWOOD	MILLS	190203X	5260	REGULAR	06/28/74	05/17/82	12/05/74	COMPLETE	05/17/82	82-04	13	01	5
GLIDDEN	CARROLL	190044	1078	REGULAR	08/16/74	06/10/80*	05/13/75				12	03	5
GOLDFIELD	WRIGHT	190584A	789	NOT PART.	06/25/76	09/05/78					05	03	3
GRANGER	DALLAS	190104B	618	REGULAR	03/22/74	08/01/87	10/28/76	E. CONV.	08/01/87		11	03	5
GRANT	MONTGOMERY	190468	143	NOT PART.	11/19/76						13	02	5
GRANVILLE	SIOUX	190737	336	REGULAR	09/26/75	02/20/78*	12/27/77				03	01	6
GRAY	AUDUBON	190318A	108	NOT PART.	07/19/77						12	02	5
GREELEY	DELAWARE	190739	313	REGULAR	10/28/76	06/10/80*	05/03/79				08	06	2
GREENE	BUTLER	190037X	1332	REGULAR	05/17/74	10/15/82	07/08/75	COMPLETE	10/05/82	82-16	07	05	3
GREENE COUNTY		190869X	4847	NOT PART.	08/14/77						12		5
GRIMES	POLK	190228X	1973	REGULAR	03/05/76	04/30/86	11/06/85	COMPLETE	08/30/83	85-07	11	03	4
GRISWOLD	CASS	190346X	1176	REGULAR	08/19/75	05/18/92	10/28/76	COMPLETE	05/01/87		13	02	5
GRUNDY CENTER	GRUNDY	190403	2880	NOT PART.	07/02/76						07	05	3
GUERNSEY	POWESHIEK	190487	83	NOT PART.	04/30/76						06	05	1
GUTHRIE CENTER	GUTHRIE	190135X	1713	REGULAR	05/17/74	06/01/87	07/08/75	E. CONV.	06/01/87		12	03	5
GUTHRIE COUNTY		190871X	5868	EMERGENCY	08/23/77		11/09/83				12		5
GUTTENBERG	CLAYTON	190077X	2428	REGULAR	02/08/74	09/05/84	05/01/74	COMPLETE	03/04/80	80-02	01	06	2
HAMBURG	FREMONT	190133X	1597	REGULAR	06/14/74	08/04/88	08/11/75	COMPLETE	08/04/88	89-05	13	02	5
HAMPTON	FRANKLIN	190131X	4630	REGULAR	08/21/74	05/01/79	08/18/74	COMPLETE	05/01/79	79-06	02	05	3
HANCOCK	POTTAWATTAMIE	190236B	254	NOT PART.	08/30/74	07/16/81		COMPLETE	07/16/81		13	02	5
HANCOCK COUNTY		190873X	8478	NOT PART.	09/08/77						02		3
HANLONTOWN	WORTH	190833	213	NOT PART.	08/04/76						02	05	3
HARLAN	SHELBY	190248X	5357	REGULAR	06/28/74	04/04/83	08/27/74	COMPLETE	04/04/83	83-06	13	02	5
HARPERS FERRY	ALLAMAKEE	190318	258	EMERGENCY	10/29/76		11/18/93				01	06	2
HARTFORD	WARREN	190589	761	NOT PART.	03/19/76						11	03	5
HARTLEY	OBRIEN	190580	1700	REGULAR	09/26/75	06/10/80*	10/26/76				03	01	6
HARVEY	MARION	190455	275	NOT PART.	03/19/76						11	03	4
HASTINGS	MILLS	190204X	215	REGULAR	09/19/75	09/16/82	10/14/82	COMPLETE	09/16/82	82-13	13	02	5
HAVELOCK	POCAHONTAS	190484	278	NOT PART.	03/19/76						05	03	6
HAWARDEN	SIOUX	190252X	2722	REGULAR	05/24/74	01/16/81	09/23/74	COMPLETE	01/16/81	81-01	03	01	6
HAZLETON	BUCHANAN	190330	877	NOT PART.	05/28/76						07	06	3
HIAWATHA	LINN	190441X	4825	REGULAR	04/23/76	02/03/82	08/03/76	COMPLETE	02/03/82	82-01	10	05	2
HILLS	JOHNSON	190170X	547	REGULAR	12/28/73	08/16/88	08/11/75	COMPLETE	08/16/88	89-03	10	05	1
HINTON	PLYMOUTH	190224B	659	REGULAR	09/06/74	09/27/85	08/27/76	E. CONV.	09/27/85		04	01	6

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG EMT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
HOLLAND	GRUNDY	190404A	278	REGULAR	07/02/76	07/17/86	11/07/79	E. CONV.	07/17/86		07	05	3
HOPKINTON	DELAWARE	190364A	774	REGULAR	10/28/76	07/02/87	02/12/82	E. CONV.	07/02/87		06	06	2
HORNICK	WOODBURY	190291A	239	REGULAR	10/18/74	09/27/88	07/06/75	E. CONV.	09/27/88		04	01	6
HOSPERS	SIOUX	190510A	855	REGULAR	09/26/75	09/18/85	09/23/76	E. CONV.	09/18/85		03	01	6
HUBBARD	HARDIN	190411	852	NOT PART.	07/02/76						06	05	3
HUDSON	BLACK HAWK	190022X	2267	REGULAR	03/06/74	01/16/80	08/01/78	COMPLETE	01/16/80	80-03	07	05	3
HUMBOLDT	HUMBOLDT	190188B	4784	SUSPENDED	04/05/74	05/19/81	01/28/76	COMPLETE	05/19/81	81-08	05	03	6
IDA GROVE	IDA	190188X	2285	REGULAR	01/23/74	09/05/79	04/26/74	COMPLETE	09/05/79	79-08	04	01	6
IMOGENE	FREMONT	190391	188	NOT PART.	10/29/76						13	02	5
INDEPENDENCE	BUCHANAN	190031X	6392	REGULAR	05/03/74	10/18/88	09/24/71	COMPLETE	05/16/77	77-02	07	06	3
INDIANOLA	WARREN	190278	10643	REGULAR	04/30/76	07/31/79*	06/01/77				11	03	5
INWOOD	LYON	190258B	785	SUSPENDED	06/06/75	06/01/87	08/18/76		08/01/87		03	01	6
IOWA CITY	JOHNSON	190171X	50508	REGULAR	05/02/77	05/05/83	02/04/72	COMPLETE	05/02/77	77-08	10	05	1
IOWA COUNTY		190478X	9189	NOT PART.	C5/16/77						10		1
IOWA FALLS	HARDIN	190140B	6174	REGULAR	06/26/74	08/01/87	07/24/78	E. CONV.	08/01/87		06	05	3
IRWIN	SHELBY	190249X	427	REGULAR	12/20/74	07/16/81	05/01/75	COMPLETE	07/16/81	81-12	13	02	5
JACKSON COUNTY		190079X	8046	REGULAR	05/24/77	05/01/90	06/17/78	E. CONV.	05/01/90		08		2
JACKSON JUNCTION	WINNESHIEK	190533	94	NOT PART.	06/25/76						01	06	2
JAMAICA	GUTHRIE	190744	278	NOT PART.	08/13/76						12	03	5
JANESVILLE	BLACK HAWK	190023B	840	REGULAR	12/26/73	07/16/80	05/26/82	COMPLETE	07/16/80	80-05	07	05	3
JASPER COUNTY		190080X	11843	REGULAR	06/03/77	01/01/87	03/23/83	E. CONV.	01/01/87		11		4
JEFFERSON	GREENE	190396A	4854	REGULAR	08/29/75	09/01/86	12/23/76	E. CONV.	09/01/86		12	03	5
JEWELL	HAMILTON	190600	1145	NOT PART.	08/13/76						05	04	3
JOHNSON COUNTY		190082X	13113	REGULAR	11/20/77	07/16/87	08/01/78	COMPLETE	08/19/85	85-08	10		1
JOHNSTON	POLK	190748X	2617	REGULAR	04/01/77	05/03/82	08/03/77	COMPLETE	05/03/82	82-10	11	03	4
JONES COUNTY		190919X	8659	REGULAR	04/22/77	09/30/88	03/21/78	E. CONV.	09/30/88		10		2
KAMAKWA	MANCOCK	190408	756	NOT PART.	10/28/76						02	03	3
KELLOGG	JASPER	190164B	654	REGULAR	06/21/74	06/01/87	06/03/77	E. CONV.	06/01/87		11	04	4
KEOKUK	LEE	190186X	13536	REGULAR	01/23/74	03/01/78	03/20/74	COMPLETE	03/01/78	78-04	16	03	1
KEOKUK COUNTY		190483X	8209	NOT PART.	08/23/77						15		4
KEOSAUQUA	VAN BUREN	190268B	1003	REGULAR	01/16/74	09/05/78	01/14/75	COMPLETE	09/05/78	78-10	16	03	1
KIMBALLTON	AUDUBON	190014X	362	REGULAR	12/13/74	06/18/87	04/08/75	E. CONV.	09/01/86		12	02	5
KINGSLEY	PLYMOUTH	190477A	1209	REGULAR	08/06/76	09/27/85	08/25/77	E. CONV.	09/27/85		04	01	6
KINROSS	KEOKUK	190426	79	NOT PART.	08/13/76						16	05	4
KIRKMAN	SHELBY	190250X	95	REGULAR	08/22/75	05/17/82	08/09/76	COMPLETE	05/17/82	82-05	13	02	5
KIRON	CRAWFORD	190098A	317	REGULAR	11/08/74	08/01/86	11/23/76	E. CONV.	08/01/86		12	01	6
KNIERIM	CALHOUN	190339A	125	REGULAR	08/13/76	05/01/87	08/21/76	E. CONV.	05/01/87		05	03	6
KNOXVILLE	MARION	190403	8143	REGULAR	08/29/75	10/27/77*	08/10/76				11	03	4
KOSSUTH COUNTY		190484X	11108	REGULAR	06/21/77	05/01/92	10/01/81	E. CONV.	05/01/92		02		6
LA PORTE CITY	BLACK HAWK	190309X	2324	REGULAR	12/06/74	01/02/81	02/02/76	COMPLETE	01/02/81	84-05	07	05	3
LACONA	WARREN	190782A	376	REGULAR	08/18/75	07/01/87	12/08/76	E. CONV.	07/01/87		11	03	5
LADORA	IOWA	190425	289	NOT PART.	08/18/75						10	05	1
LAKE PARK	DICKINSON	190367A	1123	REGULAR	07/30/76	09/01/87	08/17/77	E. CONV.	09/01/87		03	01	6
LAKE VIEW	SAC	190503X	1281	REGULAR	07/23/76	06/04/80	03/03/75	COMPLETE	06/04/80		12	03	6
LAMONI	DECATUR	190110A	2705	REGULAR	08/20/76	05/01/87	06/04/75	E. CONV.	05/01/87		14	02	5
LAMONT	BUCHANAN	190331	554	NOT PART.	08/12/75						07	06	3
LANSING	ALLAMAKEE	190106A	1181	NOT PART.	01/04/74	11/22/77					01	06	2
LARCHWOOD	LYON	190405	701	REGULAR	08/29/75	06/30/80*	08/30/76				03	01	6
LATIMER	FRANKLIN	190389	441	EMERGENCY	03/26/76		09/18/90				02	05	3
LAWLER	CHICKASAW	190067B	534	REGULAR	06/26/74	08/01/86	07/25/75	E. CONV.	08/01/86		07	06	3
LAWTON	WOODBURY	190292B	447	REGULAR	06/18/74	09/01/86	08/08/75	E. CONV.	09/01/86		04	01	6

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG EMT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
LE CLAIRE	SCOTT	190243X	2899	REGULAR	12/17/73	08/15/80	08/08/74	COMPLETE	08/15/80	80-06	09	06	1
LE GRAND	MARSHALL	190606A	821	SUSPENDED	11/12/76	09/01/87	12/05/77		09/01/87		06	05	3
LE MARS	PLYMOUTH	190225B	8276	REGULAR	01/16/74	05/01/78	08/07/75	COMPLETE	05/01/78	77-08	04	01	6
LEE COUNTY		190182X	10000	REGULAR	06/21/77	06/15/81	09/11/78	COMPLETE	06/15/81	83-03	16		1
LEMIGH	WEBSTER	190310A	654	REGULAR	08/18/75	09/04/85	10/03/78	E. CONV.	09/04/85		05	03	6
LELAND	WINNEBAGO	190529X	274	REGULAR	04/18/76	01/02/81	10/02/75	COMPLETE	01/02/81	80-14	02	05	6
LEON	DECATUR	190111B	2094	REGULAR	08/08/74	08/04/88	11/27/74	E. CONV.	08/04/88		14	02	5
LESTER	LYON	190188B	274	REGULAR	12/20/74	09/04/86	11/27/75	E. CONV.	09/04/86		03	01	6
LETTS	LOUISA	190311X	473	REGULAR	12/27/74	02/06/91	09/02/93	E. CONV.	02/06/91		16	05	1
LEWIS	CASS	190347	497	REGULAR	08/22/75	02/14/77*	10/26/76				13	02	5
LIME SPRINGS	HOWARD	190417A	476	REGULAR	09/18/75	09/01/87	01/24/77	E. CONV.	09/01/87		01	06	3
LINN COUNTY		190829X	24179	REGULAR	06/03/77	12/15/82	01/08/79	COMPLETE	12/15/82	83-01	10		2
LINN GROVE	BUENA VISTA	190032A	208	NOT PART.	08/16/74	03/03/76					03	01	6
LISBON	LINN	190607	1458	REGULAR	03/18/76	08/10/80*	03/23/78				10	05	2
LITTLE ROCK	LYON	190448A	490	SUSPENDED	08/18/75	09/18/85	09/23/76		09/18/85		03	01	6
LITTLE SIOUX	HARRISON	190148A	281	SUSPENDED	10/25/74	08/19/85	09/25/75		08/19/85		13	01	5
LITTLEPORT	CLAYTON	190078B	106	REGULAR	08/23/74	08/04/87	08/17/77	E. CONV.	08/04/87		01	06	2
LIVERMORE	HUMBOLDT	190608	480	NOT PART.	10/28/76						05	03	6
LOGAN	HARRISON	190146B	1540	REGULAR	04/12/74	09/18/85	01/18/75	E. CONV.	09/18/85		13	01	5
LOHRVILLE	CALHOUN	190609	521	REGULAR	09/26/75	04/15/85*	11/12/76				05	03	6
LOUISA COUNTY		190193X	8003	REGULAR	12/27/74	02/06/91	10/18/74	COMPLETE	02/06/91	93-03	16		1
LOWDEN	CEDAR	190054B	717	REGULAR	06/28/74	08/19/85	10/01/75	E. CONV.	08/19/85		10	06	2
LU VERNE	KOSSUTH	190768	418	NOT PART.	08/18/75						02	03	6
LUCAS	LUCAS	190196A	292	REGULAR	11/26/74	08/16/88	12/29/75	E. CONV.	08/16/88		15	03	4
LYON COUNTY		190886A	8849	NOT PART.	05/31/77						03		6
LYTTON	CALHOUN	190760A	377	SUSPENDED	08/26/75	09/01/87	10/08/76		09/01/87		05	03	6
MADISON COUNTY		190687X	8635	EMERGENCY	01/17/78		09/10/93				11		5
MADRID	BOONE	190328	2281	REGULAR	08/18/75	08/10/80*	10/21/76				11	03	5
MAHASKA COUNTY		190888X	9930	EMERGENCY	08/07/77		03/05/84				15		4
MALCOM	POWESHIEK	190498	418	NOT PART.	08/19/75						06	05	1
MALVERN	MILLS	190205X	1244	REGULAR	03/08/74	09/16/82	08/04/75	COMPLETE	09/16/82	83-04	13	02	5
MANCHESTER	DELAWARE	190112X	4942	REGULAR	08/02/74	10/15/82	04/25/75	COMPLETE	10/15/82	82-15	08	06	2
MANILLA	CRAWFORD	190099B	1020	REGULAR	06/28/74	06/03/86	07/08/75	E. CONV.	06/03/86		12	02	6
MANLY	WORTH	190834	1498	NOT PART.	07/09/76						02	05	3
MANNING	CARROLL	190048B	1809	REGULAR	08/23/74	09/01/86	11/08/74	E. CONV.	09/01/86		12	02	5
MAPLETON	MONONA	190208B	1495	SUSPENDED	12/28/74	08/27/85	11/11/74		08/27/85		04	01	6
MAQUOKETA	JACKSON	190160B	6313	REGULAR	06/28/74	08/05/86	09/10/76	E. CONV.	08/05/86		08	06	2
MARBLE ROCK	FLOYD	190383	419	NOT PART.	07/30/76						02	05	3
MARENGO	IOWA	190157C	2308	REGULAR	01/23/74	10/13/81	09/04/74	COMPLETE	01/16/80	80-04	10	05	1
MARION	LINN	190191X	18474	REGULAR	03/01/74	07/05/82	08/30/75	COMPLETE	07/05/82	82-06	10	05	2
MARION COUNTY		190688A	8233	NOT PART.	10/18/77						11		4
MARNE	CASS	190348	162	NOT PART.	10/28/76						13	02	5
MARQUETTE	CLAYTON	195182C	528	REGULAR	01/21/72	10/03/75	04/16/71	COMPLETE	01/21/72		01	06	2
MARSHALL COUNTY		190690X	8497	NOT PART.	06/03/77						06		3
MARSHALLTOWN	MARSHALL	190200X	26938	REGULAR	01/23/74	04/17/84	05/02/75	COMPLETE	04/17/84	84-04	06	05	3
MARTENSDALE	WARREN	190574	438	NOT PART.	04/18/76						11	03	5
MARYSVILLE	MARION	190456	84	NOT PART.	07/02/76						11	03	4
MASON CITY	CERRO GORDO	190060X	30144	REGULAR	03/01/74	12/02/80	03/21/75	RESTUDY	12/02/80	80-10	02	05	3
MASONVILLE	DELAWARE	190365A	150	EMERGENCY	08/13/76	10/31/78	10/28/93				06	06	2
MASSENA	CASS	190349	518	NOT PART.	05/21/76						13	02	5
MAURICE	SIOUX	190512	288	NOT PART.	03/19/76						03	01	6

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG ENT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
MAXWELL	STORY	190257X	783	REGULAR	06/28/74	02/18/84	07/24/75	COMPLETE	02/15/84	84-01	11	04	5
MAYNARD	FAYETTE	190377A	561	REGULAR	06/10/75	06/01/86	09/29/76	E. CONV.	06/01/86		07	06	2
MCGREGOR	CLAYTON	195183A	945	REGULAR	01/21/72	10/17/78	04/09/71	COMPLETE	01/21/72		01	06	2
MCINTIRE	MITCHELL	190458	197	NOT PART.	06/28/75						02	06	3
MELROSE	MONROE	190466A	218	REGULAR	07/02/76	07/02/87	07/16/81	E. CONV.	07/02/87		15	03	4
MERRILL	PLYMOUTH	190478A	737	REGULAR	07/02/76	11/06/91	06/13/80	E. CONV.	11/06/91		04	01	6
MILES	HENRY	190770	398	NOT PART.	11/19/76						08	06	2
MILLS COUNTY		190681X	4443	REGULAR	10/18/77	06/03/88	10/14/82	COMPLETE	09/16/82	82-12	13		5
MILLVILLE	CLAYTON	190681A	80	REGULAR	07/02/87	07/02/87	07/06/76	E. CONV.	07/02/87		01	06	2
MINDEN	POTTAWATTAMIE	190781X	419	REGULAR	10/20/76	06/01/82	02/02/88	COMPLETE	06/01/82	86-04	13	01	5
MINGO	JASPER	190166	303	NOT PART.	06/05/75						11	04	4
MISSOURI VALLEY	HARRISON	190147X	3107	REGULAR	04/12/74	08/01/77	09/28/72	COMPLETE	08/01/77	77-05	13	01	5
MITCHELL	MITCHELL	190458	193	NOT PART.	11/05/76						02	05	3
MITCHELL COUNTY		190882X	6486	NOT PART.	06/07/77						02		3
MONDAMIN	HARRISON	190149	423	REGULAR	10/18/74	06/10/80*	05/22/75				13	01	5
MONMOUTH	JACKSON	190161	210	NOT PART.	01/17/75						08	06	2
MONTEZUMA	POWESHIEK	190622A	1485	REGULAR	09/26/75	06/01/88	10/20/78	E. CONV.	06/01/88		06	04	1
MONTICELLO	JONES	190176X	3641	REGULAR	06/07/74	04/02/79	11/27/74	COMPLETE	04/02/79	79-02	10	06	2
MONTOUR	TAMA	190782	387	NOT PART.	09/05/75						06	05	3
MONTROSE	LEE	190166X	1038	REGULAR	01/23/74	02/18/81	06/06/75	COMPLETE	02/18/81	80-13	16	05	1
MOORHEAD	MONONA	190783	264	REGULAR	09/19/75	04/17/87*	11/04/76				04	01	6
MOORLAND	WEBSTER	190784	257	REGULAR	10/20/76	04/17/87*	11/04/76				05	03	8
MORAVIA	APPANOOSE	190623A	706	REGULAR	03/10/76	07/01/87	12/14/78	E. CONV.	07/01/87		15	02	4
MOUNT STERLING	VAN BUREN	190523	86	NOT PART.	04/12/78						15	02	1
MOUNT VERNON	LINN	190182	3325	REGULAR	06/04/76	06/10/80*	12/10/75				10	05	2
MOVILLE	WOODBURY	190203B	1273	SUSPENDED	02/18/77	09/01/86	02/23/76		09/01/86		04	01	6
MUSCATINE	MUSCATINE	190213X	23487	REGULAR	02/01/74	04/25/81	01/15/74	COMPLETE	01/05/78	78-01	09	06	1
MUSCATINE		190636X	8004	REGULAR	05/31/77	10/17/86	04/08/77	COMPLETE	10/17/86	86-05	09		1
MUSCATINE COUNTY		190610B	885	REGULAR	11/01/74	01/01/87	10/15/76	E. CONV.	01/01/87		16	02	4
MYSTIC	APPANOOSE	190010B	1848	REGULAR	05/24/74	09/29/78	12/19/74	COMPLETE	09/29/78	78-09	07	05	3
NASHUA	CHICKASAW	190068X	1812	REGULAR	09/19/75	11/17/82	12/17/80	COMPLETE	11/17/82		13	01	5
NECLA	POTTAWATTAMIE	190493X	839	REGULAR	09/19/75	08/03/81	11/25/74	COMPLETE	08/03/81	81-11	11	04	5
NEVADA	STORY	190258X	5812	REGULAR	08/28/74	09/30/88	10/29/82	E. CONV.	09/30/88		01	06	2
NEW ALBIN	ALLAMAKEE	190842X	609	REGULAR	05/17/74	09/01/87	03/07/75	E. CONV.	09/01/87		07	06	3
NEW HAMPTON	CHICKASAW	190068C	3940	REGULAR	06/28/74	09/01/87	03/07/75	E. CONV.	09/01/87		07	06	3
NEW HARTFORD	BUTLER	190038X	764	REGULAR	05/31/74	09/29/88	11/06/74	COMPLETE	09/29/88	88-04	07	05	3
NEW VIENNA	DUBUQUE	190121X	450	REGULAR	08/18/74	10/18/83	08/01/75	RESTUDY	10/18/83	83-16	08	06	2
NEWELL	BUENA VISTA	190334A	913	SUSPENDED	11/19/76	09/01/88	11/22/76		09/01/88		03	03	8
NEWTON	JASPER	190628X	15292	REGULAR	04/30/76	08/05/86	05/09/77	E. CONV.	08/05/86		11	04	4
NICHOLS	MUSCATINE	190214X	375	REGULAR	11/08/74	10/17/86	06/06/75	COMPLETE	10/17/86	86-01	09	05	1
NORA SPRINGS	FLOYD	190384A	1872	REGULAR	09/26/75	09/01/87	04/25/80	E. CONV.	09/01/87		02	05	3
NORTH BUENA VISTA	CLAYTON	190082A	155	NOT PART.	10/18/74	03/19/76					01	06	2
NORTH LIBERTY	JOHNSON	190630X	2048	REGULAR	04/23/76	11/05/86	05/24/77	COMPLETE	11/05/86	87-02	10	05	1
NORTHWOOD	WORTH	190302B	2193	REGULAR	05/10/74	08/01/87	05/13/75	E. CONV.	08/01/87		02	05	3
NORWALK	WARREN	190631	2313	EMERGENCY	03/03/83		03/03/83				11	03	5
NORWAY	BENTON	190632	633	NOT PART.	09/26/75						10	05	1
OAKLAND	POTTAWATTAMIE	190237X	1552	REGULAR	01/09/74	08/03/81	05/30/75	COMPLETE	08/03/81	88-02	13	02	5
OAKVILLE	LOUISA	190319X	470	REGULAR	05/02/75	02/06/91	08/05/75	E. CONV.	08/01/86		16	05	1
OCHEYEDAN	OSCEOLA	190472A	599	SUSPENDED	03/19/76	09/18/85	08/30/76		09/18/85		03	01	6
ODEBOLT	SAC	190633B	1299	REGULAR	08/29/75	09/01/86	09/22/76	E. CONV.	09/01/86		12	01	6
OELWEIN	FAYETTE	190126X	7564	REGULAR	07/26/74	07/04/88	10/14/75	COMPLETE	07/04/88	88-01	07	06	2
OLIN	JONES	190176B	735	REGULAR	08/30/74	02/01/87	07/12/76	E. CONV.	02/01/87		10	06	2

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG ENT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
OSTERDOCK	CLAYTON	190083B	35	SUSPENDED	07/18/78	08/01/86	09/24/75		08/01/86		01	06	2
OTO	WOODBURY	190294A	172	NOT PART.	09/13/74	01/23/76					04	01	6
OTTUMWA	WAPELLO	190272X	27381	REGULAR	03/15/74	08/15/80	06/02/72	COMPLETE	08/15/80	80-08	15	03	4
OXFORD	JOHNSON	190172B	676	REGULAR	05/10/74	09/18/91	08/26/80	E. CONV.	09/18/91		10	05	1
OXFORD JUNCTION	JONES	190177B	800	REGULAR	06/21/74	08/19/85	06/23/75	E. CONV.	08/19/85		10	06	2
OYENS	PLYMOUTH	190478	146	NOT PART.	07/16/76						04	01	6
PACIFIC JUNCTION	MILLS	190206X	511	REGULAR	12/23/74	03/16/89	12/23/74	COMPLETE	04/04/83	83-07	13	01	5
PALO	LINN	190442X	529	REGULAR	09/19/75	11/17/82	06/25/76	COMPLETE	11/17/82	82-08	10	05	2
PALO ALTO, COUNTY		190898X	5700	NOT PART.	05/17/77						03		6
PANAMA	SHELBY	190251X	228	REGULAR	12/20/74	08/28/80	10/02/75	E. CONV.	08/28/80		13	01	5
PANORA	GUTHRIE	190405	1211	NOT PART.	08/06/76						12	03	5
PANORAMA PARK	SCOTT	190506X	145	REGULAR	12/10/76	06/15/78	12/17/80	COMPLETE	06/15/78		09	06	1
PARKERSBURG	BUTLER	190337	1968	NOT PART.	07/02/76						07	05	3
PATON	GREENE	190397	291	NOT PART.	09/19/75						12	03	5
PATTERSON	MADISON	190451A	138	REGULAR	10/01/76	01/01/87	03/27/79	E. CONV.	01/01/87		11	03	5
PERRY	DALLAS	190105B	7053	REGULAR	05/03/74	09/04/85	08/10/75	E. CONV.	09/04/85		11	03	5
PERSIA	HARRISON	190180A	355	REGULAR	12/13/74	09/04/85	04/06/76	E. CONV.	09/04/85		13	01	5
PIERSON	WOODBURY	190295B	406	SUSPENDED	09/13/74	09/18/85	06/25/75		09/18/85		04	01	6
PILOT MOUND	BOONE	190326A	223	REGULAR	11/05/76	07/01/91	08/28/80	E. CONV.	07/01/91		11	03	5
PISGAH	HARRISON	190161	307	EMERGENCY	12/06/74		09/02/83				13	01	5
PLAINFIELD	BREMER	190327X	489	REGULAR	11/05/76	07/18/90	06/18/79	COMPLETE	07/18/90	90-08	07	05	3
PLEASANT HILL	POLK	190489X	3483	REGULAR	02/04/77	05/03/82	05/03/82	COMPLETE	05/03/82	82-02	11	03	4
PLYMOUTH	CERRO GORDO	190061B	463	REGULAR	11/08/74	01/01/92	01/02/91	E. CONV.	01/01/92		02	05	3
PLYMOUTH COUNTY		190889X	10522	REGULAR	10/25/77	09/18/85	04/04/88	E. CONV.	09/18/85		04		6
POCAHONTAS	POCAHONTAS	190486	2352	NOT PART.	07/30/76						05	03	8
POLK COUNTY		190901X	25000	REGULAR	08/23/77	11/18/82	09/06/78	COMPLETE	03/01/84	84-02	11		4
PORTSMOUTH	SHELBY	190507A	240	REGULAR	08/19/75	09/01/86	10/06/75	E. CONV.	09/01/86		13	01	5
POTTAWATTAMIE COUNTY		190232X	15320	REGULAR	12/06/77	04/14/83	08/03/83	COMPLETE	04/14/83	83-01	13		5
PRESCOTT	ADAMS	190004	348	NOT PART.	11/05/76						14	02	5
PRESTON	JACKSON	190431	1120	REGULAR	09/19/75	03/03/92	02/28/84	E. CONV.	03/03/92		08	06	2
PRINCETON	SCOTT	190244X	865	REGULAR	03/01/74	11/01/78	07/30/74	COMPLETE	11/01/78	78-01	09	06	1
PROTIVIN	HOWARD	190418A	368	SUSPENDED	09/12/75	08/19/86	07/08/80		08/19/86		01	06	3
QUASQUETON	BUCHANAN	190332B	899	REGULAR	11/08/76	07/02/87	05/06/77	E. CONV.	07/02/87		07	06	3
RANDOLPH	FREMONT	190382	223	NOT PART.	03/19/76						13	02	5
RAYMOND	BLACK HAWK	190024B	655	REGULAR	03/22/74	07/11/78	07/02/75	E. CONV.	07/11/78		07	05	3
REASNOR	JASPER	190187A	277	EMERGENCY	11/01/74	02/20/76	05/24/83				11	04	4
RED OAK	MONTGOMERY	190210X	6610	REGULAR	06/28/74	01/03/90	08/22/74	COMPLETE	08/03/81	81-15	13	02	5
REDFIELD	DALLAS	190361A	859	REGULAR	03/26/76	09/18/85	10/26/76	E. CONV.	09/18/85		11	03	5
REINBECK	GRUNDY	190648A	1808	NOT PART.	12/10/76	05/24/77					07	05	3
RENSEN	PLYMOUTH	190480A	1592	REGULAR	03/19/76	08/01/86	11/04/82	E. CONV.	08/01/86		04	01	6
RICEVILLE	HOWARD	190418	819	NOT PART.	03/19/76						01	06	3
RICKETTS	CRAWFORD	190100A	143	REGULAR	11/22/74	09/01/89	01/22/88	E. CONV.	09/01/89		12	01	6
RINARD	PAGE	190342	87	NOT PART.	10/20/76						05	03	6
RIPPEY	GREENE	190399	304	REGULAR	03/26/76	04/18/85*	11/06/75				12	03	5
RIVERDALE	SCOTT	190245X	462	REGULAR	01/23/74	11/13/78	07/07/75	COMPLETE	01/05/78	89-01	09	06	1
RIVERSIDE	WASHINGTON	190648A	826	SUSPENDED	08/13/76	08/01/86	05/06/81		08/01/86		10	05	1
RIVERTON	FREMONT	190393	342	NOT PART.	08/13/76						13	02	5
ROBINS	LINN	190443X	726	REGULAR	03/26/76	07/05/82	01/16/78	COMPLETE	07/05/82	82-18	10	05	2
ROCK FALLS	CERRO GORDO	190351A	148	NOT PART.	01/14/77						02	05	3
ROCK RAPIDS	LYON	190198X	2693	REGULAR	03/29/74	05/02/91	05/28/75	COMPLETE	08/01/86		03	01	6
ROCK VALLEY	SIOUX	190253B	2706	REGULAR	05/13/77	11/01/85	09/24/76	E. CONV.	11/01/85		03	01	6

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG ENT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
ROCKFORD	FLOYD	190129B	1012	REGULAR	06/03/74	09/01/87	07/28/78	E. CONV.	09/01/87		02	05	3
ROCKWELL	CERRO GORDO	190352A	1038	REGULAR	03/26/76	07/01/91	10/11/90	E. CONV.	07/01/91		02	05	3
ROCKWELL CITY	CALHOUN	190343A	2276	REGULAR	03/26/76	02/01/87	12/08/80	E. CONV.	02/01/87		05	03	6
RODNEY	MONONA	190821	62	REGULAR	07/04/78	08/10/80*	10/24/78				04	01	6
ROLAND	STORY	190513B	1005	REGULAR	03/25/77	04/02/90	09/08/82	E. CONV.	04/02/90		11	04	5
ROME	HENRY	190414	113	NOT PART.	07/09/76						18	04	1
RUDD	FLOYD	190388	460	NOT PART.	04/23/76						02	05	3
RUNNELLS	POLK	190800	285	NOT PART.	09/10/75						11	03	4
RUSSELL	LUCAS	190648A	593	REGULAR	09/26/75	06/01/86	10/26/76	E. CONV.	06/01/86		15	02	4
RUTLAND	HUMBOLDT	190422	183	NOT PART.	11/05/76						05	03	6
RYAN	DELAWARE	190401	390	NOT PART.	03/26/76						06	06	2
SABULA	JACKSON	190162X	824	REGULAR	01/09/74	11/19/87	04/22/74	COMPLETE	11/19/87		08	06	2
SAC CITY	SAC	190238B	3000	REGULAR	12/26/73	03/16/86	10/02/75	E. CONV.	03/16/86		12	03	6
SAGEVILLE	DUBUQUE	190122X	291	REGULAR	11/01/74	08/16/84	11/20/74	COMPLETE	08/16/84	84-06	08	06	2
SALIX	WOODBURY	190298	429	REGULAR	10/16/74	04/25/80*	11/03/75				04	01	6
SCARVILLE	WINNEBAGO	190831	82	NOT PART.	07/02/76						02	05	6
SCHALLER	SAC	190482	832	NOT PART.	11/05/76						12	01	6
SCOTT COUNTY		190239X	11641	REGULAR	06/01/77	01/06/89	12/30/71	COMPLETE	06/01/77	81-14	09		1
SEARSBORO	POWESHIEK	190499	134	NOT PART.	10/29/76						06	04	1
SERGEANT BLUFF	WOODBURY	190297	2418	REGULAR	03/29/74	03/18/87*	06/30/75				04	01	6
SEYMOUR	WAYNE	190658A	1038	REGULAR	03/26/76	07/01/87	02/06/76	E. CONV.	07/01/87		15	02	5
SHANNON CITY	RINGGOLD	190821	93	NOT PART.	08/13/76						14	02	5
SHEFFIELD	FRANKLIN	190132B	1224	REGULAR	06/28/74	07/01/91	11/21/80	E. CONV.	07/01/91		02	05	3
SHELBY COUNTY		190905X	7124	REGULAR	03/24/77	02/10/81	09/12/75	E. CONV.	02/10/81		13		5
SHELDON	OBRIEN	190216B	5003	REGULAR	12/24/76	09/18/85	11/27/85	E. CONV.	09/18/85		03	01	6
SHELL ROCK	BUTLER	190338A	1478	REGULAR	12/17/76	05/01/92	10/01/81	E. CONV.	05/01/92		07	05	3
SHELLSBURG	BENTON	190819	771	EMERGENCY	10/29/76		09/02/83				10	05	1
SHENANDOAH	PAGE	190220B	5274	REGULAR	06/28/74	09/01/86	08/25/75	E. CONV.	09/01/86		13	02	5
SHUEYVILLE	JOHNSON	195104B	267	REGULAR	11/19/76	09/11/91	03/06/81	E. CONV.	09/01/91		10	05	1
SIBLEY	OSCEOLA	190218B	3081	REGULAR	05/17/74	09/27/85	07/23/75	E. CONV.	09/27/85		03	01	6
SILVER CITY	MILLS	190207B	291	REGULAR	11/08/74	09/04/85	01/02/76	E. CONV.	09/04/85		13	02	5
SIOUX CENTER	SIOUX	190658B	4588	REGULAR	09/26/75	09/02/88	08/20/76	E. CONV.	09/02/88		03	01	6
SIOUX CITY	WOODBURY	190298X	82003	REGULAR	06/02/74	04/12/83	05/14/71	COMPLETE	08/01/79	79-04	04	01	6
SIOUX COUNTY		190906X	10713	NOT PART.	10/25/77						03		6
SIOUX RAPIDS	BUENA VISTA	190033B	897	REGULAR	05/10/74	06/18/87	07/28/75	E. CONV.	06/18/87		03	01	6
SLOAN	WOODBURY	190299	878	REGULAR	05/24/74	08/10/80*	08/12/75				04	01	6
SMITHLAND	WOODBURY	190300A	282	REGULAR	11/12/76	09/27/85	09/05/75	E. CONV.	09/27/85		04	01	6
SOLDIER	MONONA	190805	257	NOT PART.	08/13/76						04	01	6
SOLON	JOHNSON	190432A	969	REGULAR	08/13/76	07/01/91	08/18/80	E. CONV.	07/01/91		10	05	1
SOMERS	CALHOUN	190344	220	EMERGENCY	10/29/76		03/11/94				05	03	6
SPENCER	CLAY	190071X	11726	REGULAR	07/16/76	04/19/83	06/26/75	COMPLETE	01/16/81	81-04	03	01	6
SPILLVILLE	WINNESHIEK	190288	415	NOT PART.	10/29/76						01	06	2
SPIRIT LAKE	DICKINSON	190116B	3876	SUSPENDED	05/31/74	09/01/87	09/04/75		09/01/87		03	01	6
SPRINGVILLE	LINN	190444A	1165	NOT PART.	04/01/77						10	05	2
ST OLAF	CLAYTON	190064B	136	REGULAR	08/30/74	08/01/86	03/10/75	E. CONV.	08/01/86		01	06	2
STACYVILLE	MITCHELL	190461	538	NOT PART.	03/26/76						02	05	3
STANLEY	BUCHANAN	190333	154	NOT PART.	06/25/75						07	06	3
STANWOOD	CEDAR	190056	705	REGULAR	08/09/74	11/01/79*	06/14/79				10	05	2
STEAMBOAT ROCK	HARDIN	190141	387	NOT PART.	01/03/75						06	05	3
STOCKTON	MUSCATINE	190469	240	NOT PART.	11/19/76						09	05	1
STORY CITY	STORY	190258X	2762	REGULAR	05/31/74	01/16/81	06/25/75	COMPLETE	01/16/81	80-12	11	04	5

LIST OF ALL STATUS FILE RECORDS

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG ENT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
STORY COUNTY		190907X	10000	REGULAR	11/15/77	06/01/83	06/01/78	COMPLETE	06/01/83	83-14	11		5
SUMNER	BREMER	190029X	2335	REGULAR	05/02/74	07/16/90	08/08/75	COMPLETE	07/16/90		07	06	3
SWISHER	JOHNSON	190810	654	NOT PART.	08/13/76						10	05	1
TAMA	TAMA	190262X	2968	REGULAR	06/28/74	01/17/90	08/11/75	COMPLETE	01/17/90		06	05	3
TEMPLETON	CARROLL	190811	319	REGULAR	03/19/76	06/10/80*	08/03/78				12	02	5
TERRIL	DICKINSON	190812	420	REGULAR	09/10/76	06/10/80*	11/01/78				03	01	6
THOMPSON	WINNEBAGO	190866	668	NOT PART.	09/19/75						02	05	6
THOR	HUMBOLDT	190813A	200	NOT PART.	09/13/77						05	03	6
THORNTON	CERRO GORDO	190062A	442	REGULAR	12/20/74	05/01/87	12/12/75	E. CONV.	05/01/87		02	05	3
THURMAN	FREMONT	190394A	221	REGULAR	04/16/76	08/19/85	09/27/76	E. CONV.	08/19/85		13	01	5
TIFFIN	JOHNSON	190173X	419	REGULAR	11/22/74	07/01/91	08/29/80	E. CONV.	07/01/91		10	05	1
TIPTON	CEDAR	190097B	3055	REGULAR	03/29/74	09/04/85	07/02/75	E. CONV.	09/04/85		10	05	2
TITONKA	KOSSUTH	190840B	807	REGULAR	05/03/74	09/01/87	04/30/75	E. CONV.	09/01/87		02	03	6
TOLEDO	TAMA	190867	2445	NOT PART.	09/12/75						06	05	3
TRAER	TAMA	190868A	1703	REGULAR	09/19/75	09/04/85	10/28/76	E. CONV.	09/04/85		06	05	3
TRIPOLI	BREMER	190869	1280	NOT PART.	03/26/76	07/16/90			07/16/90		07	05	3
UNDERWOOD	POTTAWATTAMIE	190484X	448	REGULAR	03/26/76	06/01/82	10/28/77	COMPLETE	06/01/82	82-11	13	01	5
UNION	HARDIN	190142A	515	REGULAR	01/10/75	06/01/87	12/15/75	E. CONV.	06/01/87		06	05	3
UNIONVILLE	APPANOOSE	190823B	150	REGULAR	04/10/79	07/01/88	10/28/76	E. CONV.	07/01/88		15	02	4
UNIVERSITY PARK	MAHASKA	190671A	845	NOT PART.	03/19/76						15	04	4
URBANDALE	POLK	190230X	17869	REGULAR	05/24/74	09/17/92	06/04/75	COMPLETE	08/15/78	78-05	11	03	4
UTE	MONONA	190464	478	NOT PART.	03/19/76						04	01	6
VAIL	CRAWFORD	190101A	490	REGULAR	02/07/75	08/19/86	06/30/75	E. CONV.	08/19/86		12	01	6
VAN METER	DALLAS	190382	747	NOT PART.	09/26/75						11	03	5
VENTURA	CERRO GORDO	190874	814	NOT PART.	11/05/76						02	05	3
VICTOR	IOWA	190428A	1046	REGULAR	03/19/76	08/01/86	06/14/76	E. CONV.	08/01/86		10	05	1
VILLISCA	MONTGOMERY	190468	1434	NOT PART.	08/13/76						13	02	5
VINTON	BENTON	190018X	5040	REGULAR	04/05/74	03/02/81	07/19/74	COMPLETE	03/02/81	81-08	10	05	1
VOLGA	CLAYTON	190088B	310	REGULAR	08/30/74	08/01/86	07/23/75	E. CONV.	08/01/86		01	06	2
WADENA	FAYETTE	190360	230	NOT PART.	08/13/76						07	06	2
WALCOTT	MUSCATINE	190878	1425	NOT PART.	07/09/76						09	05	1
WALFORD	BENTON	190820	285	NOT PART.	08/13/76						10	05	1
WALKER	LINN	190445	733	NOT PART.	10/29/76						10	05	2
WALL LAKE	SAC	190504A	892	REGULAR	09/26/75	09/01/86	08/07/75	E. CONV.	09/01/86		12	01	6
WALLINGFORD	EMMET	190821A	256	REGULAR	09/26/75	07/01/87	12/08/76	E. CONV.	07/01/87		03	03	6
WAPELLO	LOUISA	190194X	2011	REGULAR	01/16/74	02/08/91	08/04/76	COMPLETE	09/01/86		16	05	1
WAPELLO COUNTY		190911X	9078	REGULAR	10/25/77	08/01/87	05/23/83	E. CONV.	08/01/87		15		4
WARREN COUNTY		190912X	11632	REGULAR	02/07/78	07/01/91	11/18/90	E. CONV.	07/01/91		11		5
WASHTA	CHEROKEE	190064B	320	REGULAR	08/30/74	09/27/85	05/29/75	E. CONV.	09/27/85		04	01	6
WATERLOO	BLACK HAWK	190025X	75985	REGULAR	06/28/74	07/03/85	05/07/71	COMPLETE	07/03/85	85-05	07	05	3
WATERVILLE	ALLAMAKEE	190317	157	NOT PART.	04/16/76						01	06	2
WAUCOMA	FAYETTE	190381A	308	REGULAR	07/30/76	09/29/86	07/15/83	E. CONV.	09/29/86		07	06	2
WAUKON	ALLAMAKEE	190008	3983	REGULAR	03/22/74	06/10/80*	08/26/75				01	06	2
WAVERLY	BREMER	190030X	8444	REGULAR	03/29/74	07/16/90	05/02/75	COMPLETE	03/02/81	81-05	07	05	3
WEBSTER CITY	HAMILTON	190137X	8572	REGULAR	08/23/74	08/01/78	04/20/73	COMPLETE	08/01/78	78-05	05	03	3
WEBSTER COUNTY		190831X	11157	REGULAR	06/02/77	10/01/85	03/02/78	E. CONV.	10/01/85		05		6
WELLMAN	WASHINGTON	190276	1125	NOT PART.	04/30/76						10	05	1
WELLSBURG	GRUNDY	190880	761	NOT PART.	10/08/76						07	05	3
WELTON	CLINTON	190089B	119	REGULAR	08/02/77	08/05/85	10/25/77	E. CONV.	08/05/85		09	06	2
WEST BRANCH	CEDAR	190050X	1867	REGULAR	03/01/74	03/16/83	12/15/75	COMPLETE	03/16/83	83-09	10	05	2
WEST DES MOINES	POLK	190231X	21894	REGULAR	06/28/74	11/01/79	07/25/74	COMPLETE	11/01/79	82-03	11	03	4

COMMUNITY NAME	COUNTY NAME	ID NUMBER	POP.	PROGRAM PHASE	ORIG ID DATE	LAST REV DATE	ORIG ENT DATE	STUDY STATUS	FIRM DATE	FPM APPROVAL	RPC COG	CONS DIST	CONG DIST
WEST LIBERTY	MUSCATINE	190218X	2723	REGULAR	01/16/74	10/17/86	05/05/75	COMPLETE	10/17/86	87-01	09	05	1
WEST POINT	LEE	190683	1133	REGULAR	07/30/76	04/16/79*	08/28/78				16	04	1
WESTFIELD	PLYMOUTH	190482	189	NOT PART.	06/13/76						04	01	6
WESTGATE	FAYETTE	190823	263	NOT PART.	10/28/76						07	06	2
WESTSIDE	CRAWFORD	190102X	387	REGULAR	01/10/75	09/01/86	07/28/75	E. CONV.	09/01/86		12	01	6
WHAT CHEER	KEOKUK	1901798	803	REGULAR	01/09/74	08/01/87	01/28/76	E. CONV.	08/01/87		15	04	4
WHEATLAND	CLINTON	190090B	840	NOT PART.	06/28/74	04/02/76					09	06	2
WHITING	MONONA	190884X	734	REGULAR	07/02/76	01/01/87	01/13/83	E. CONV.	01/01/87		04	01	6
WILLIAMSBURG	IOWA	190427X	2033	REGULAR	12/24/76	09/06/89	11/15/76	COMPLETE	09/06/89		10	06	1
WILTON	MUSCATINE	190688A	2502	REGULAR	10/22/76	07/01/91	08/30/90	E. CONV.	07/01/91		09	05	1
WINDSOR HEIGHTS	POLK	190687X	5632	REGULAR	10/22/76	10/16/92	10/07/77	COMPLETE	08/15/79	78-07	11	03	4
WINFIELD	HENRY	1906884	1042	SUSPENDED	09/10/75	09/01/88	09/24/76		09/01/88		16	04	1
WINNEBAGO COUNTY		190915X	4784	NOT PART.	07/26/77						02		6
WINTERSET	MADISON	190944X	4021	REGULAR	08/03/93	08/03/93	04/24/82	E. CONV.	05/03/93		11	03	5
WIOTA	CASS	190350	181	NOT PART.	03/19/76						13	02	5
WODEN	HANCOCK	190410	287	NOT PART.	04/30/76						02	03	3
WOODBINE	HARRISON	1901528	1483	REGULAR	06/28/74	09/14/88	05/28/75	E. CONV.	09/04/85		13	01	5
WOODBURN	CLARKE	190070	207	NOT PART.	12/20/74						14	03	5
WOODBURY COUNTY		1905368	9512	REGULAR	08/02/77	06/17/91	10/28/74	COMPLETE	06/17/91	84-01	04		6
WOOLSTOCK	WRIGHT	190827A	235	NOT PART.	06/25/76	08/28/78					05	03	3
WORTHINGTON	DUBUQUE	190123X	432	REGULAR	11/01/74	10/18/83	08/07/75	COMPLETE	10/18/83	83-17	08	06	2
WYOMING	JONES	190434X	748	REGULAR	11/12/76	09/04/85	06/10/77	E. CONV.	09/04/85		10	06	2
YORKTOWN	PAGE	190474	123	NOT PART.	10/08/76						13	02	5
ZEARING	STORY	1902608	630	REGULAR	07/19/74	05/01/87	09/28/76	E. CONV.	05/01/87		11	05	5
ZWINGLE	DUBUQUE	190371	118	NOT PART.	11/05/76						08	06	2

TOTAL NUMBER OF STATUS FILE RECORDS - 566

NOTE:

A STAR (*) FOLLOWING THE LAST REV DATE INDICATES THAT THE FLOOD HAZARD BOUNDARY MAP HAS BEEN RESCINDED BY THE FIA. THE COMMUNITY IS CONSIDERED TO BE MINIMALLY FLOOD PRONE. THE MANDATORY FLOOD INSURANCE PURCHASE REQUIREMENTS HAVE BEEN ELIMINATED. THE LOCAL ORDINANCE REMAINS IN EFFECT IN PARTICIPATING COMMUNITIES.

UDK=-OTitan101ss-P
=1XCP141ss-L

Appendix C

Iowa Department of Natural Resources
Flood Plain Development Regulations

Following is information pertaining to DNR's regulations concerning construction in flood plains of Iowa rivers and streams. This includes bridges, culverts, road embankments, channel changes, streambank stabilization, impoundments (dams), and levees.

The regulations are copied from the Iowa Administrative Code, Department 567:

Chapter 70 is entitled "Scope of Title---Definitions---Forms---Rules of Practice" and describes important introductory information concerning the regulations.

Chapter 71, "Flood Plain or Floodway Development---When Approval is Required" gives thresholds for when your project needs DNR approval, e.g., 100 square miles or more in unincorporated areas or two square miles in incorporated areas requires a permit for bridge replacements.

Chapter 72, "Criteria for Approval", gives specific criteria that must be met in order to obtain a Flood Plain Development Permit, e.g., three feet of freeboard above the Q_{50} for new bridges. This chapter is split into three divisions:

Division I: Special Criteria for Various Types of Flood Plain Development
Division II: General Criteria
Division III: Protected Stream Designation Procedure

Two tables (by IDOT) precede the regulations in this appendix in order to summarize the regulations that are most often encountered by the County or City Engineering office. The tables are only summaries, so please refer to the actual rules for specific details.

Contact DNR's Flood Plain Permits Section in Des Moines at 515/281-5029 for specific questions about a project.

Table 1
When DNR Flood Plain Approval is Needed

Type of Project	Permit Needed if Drainage Area of Stream Is:
Bridges, Culverts or Road Embankments that cross the stream: Rural Area Urban Area	 -100 square miles or more. 71.1(1) -2 square miles or more. 71.1(3)
Road Embankments that do not cross the stream (rural area)	-10 square miles or more if obstructing 3% or more of the channel or 15% or more of the flood plain.71.1(2)
Channel Changes Rural Area---no road project ---with road project Urban Area Protected Streams	 -10 square miles or more. 71.2(1)a -10 square miles or more when: 1) more than 500 feet of channel is being altered, **or** 2) length of existing channel is reduced by more than 25%. 71.2(1)b -2 square miles or more. 71.2(2) -Any drainage area requires a permit. 71.2(3)
Bank Stabilization Rural Area Urban Area 	 -100 square miles or more. 71.9(1)a -10 to 100 square miles if channel cross section is being reduced by 3% or more. 71.9(1)b -100 square miles or more. 71.9(2)a -2 to 100 square miles if channel cross section is being reduced by 3% or more. 71.9(2)b
Levees, Dams (Ponds), Flood Plain Excavation or Stockpiling	See DNR rules or call DNR to determine when approval is needed.

Table 2
Department of Natural Resources
Summary of Backwater and Freeboard Requirements for Bridges and Culverts

Bridges			
Damage Potential of Uses Affected	**Maximum Backwater for:**		**Minimum Freeboard**
	Q_{50} and less	**Q_{100}**	
Low	0.75 feet	1.5 feet	3.0 feet above Q_{50}
Moderate	0.75 feet	1.0 feet	3.0 feet above Q_{50}
High/Maximum	0.75 feet*	1.0 feet*	3.0 feet above Q_{50}
Culverts			
Culvert Type	**Maximum Backwater**		**Minimum Freeboard**
New culverts or culverts replacing bridges	Same as bridges		No minimum freeboard. Could be evaluated on case by case basis if debris and ice is a problem
Culverts replacing culverts	Backwater of existing culvert, or backwater required of bridges, whichever is greater		

* backwater cannot exceed, and must be minimized when backwater affects buildings, flood control works, etc., unless increase is mitigated.

Maximum Damage Potential---Flood damage potential associated with buildings or uses which are vital to the public, or uses that could have adverse environmental impacts if flooded (e.g., hospitals, repositories for public records, storage of hazardous material).

High Damage Potential---Flood damage potential associated with residences, businesses, industrial and commercial buildings containing damageable goods.

Moderate Damage Potential---Flood damage potential associated with industrial and commercial buildings containing removable or non-damageable goods or material. Also, seasonal homes.

Low Damage Potential---Flood damage potential associated with all uses not classified as maximum, high, or moderate.

TITLE V

FLOOD PLAIN DEVELOPMENT

CHAPTER 70

SCOPE OF TITLE—DEFINITIONS—FORMS—RULES OF PRACTICE

[Prior to 7/1/83, see INRC, chs 2 and 5]
[Prior to 12/3/86, Water, Air and Waste Management[900]]

567—70.1(455B,481A) Scope of title. The department has jurisdiction over all flood plains and floodways in the state for the purpose of establishing and implementing a program to promote the protection of life and property from floods and to promote the orderly development and wise use of the flood plains of the state. As part of the program, the department regulates flood plain development by three alternative methods: Establishment of regulations for specific stream reaches by issuance of flood plain management orders (see Chapter 75); approval of flood plain management regulations adopted by local governments (see Chapter 75); and approval of flood plain development on a case-by-case basis where areas or projects are not covered by the first two methods (see Chapter 71). Any person who desires to construct or maintain a structure, dam, obstruction, deposit or excavation, or allow the same in any flood plain or floodway has a responsibility to contact the department to determine whether approval is required from the department or a local government authorized to act for the department.

Minimum statewide criteria for most types of flood plain development are listed in Chapter 72. Special requirements for dams are listed in Chapter 73.

C-4

567—70.2(455B,481A) Definitions. Definitions used in this title are listed in alphabetical order as follows:

"Agricultural levees or dikes" means levees or dikes constructed to provide limited flood protection to land used primarily for agricultural purposes.

"Backwater" means the increase in water surface level immediately upstream from any structure, dam, obstruction or deposit, erected, used, or maintained in the floodway or on the flood plains caused by the resulting reduction in conveyance area.

"Building" means all residential housing including mobile homes as defined herein, cabins, factories, warehouses, storage sheds, and other walled, roofed structures constructed for occupation by people or animals or for storage of materials.

"Channel" means a natural or artificial flow path of a stream with definite bed and banks to collect and conduct the normal flow of water.

"Channel change" means either (a) the alteration of the location of a channel of a stream or (b) a substantial modification of the size, slope, or flow characteristics of a channel of a stream for a purpose related to the use of the stream's flood plain surface rather than for the purpose of actually using the water itself, or putting the water to a new use (Note: Diversions of water subject to the permit requirements of Iowa Code sections 455B.268 and 455B.269 usually are not channel changes). Increasing the cross-sectional area of a channel by less than ten percent is not considered a substantial modification of the size, slope, or flow characteristics of a channel of a stream.

"Dam" means a barrier which impounds or stores water.

"Development" means a structure, dam, obstruction, deposit, excavation or flood control work in a floodway or flood plain.

"Drainage district ditch" means a channel located within the boundaries of a drainage district and excavated to establish a design channel-bottom profile for efficient conveyance of water discharged from agricultural tile systems and open drains.

"Elevating" means raising buildings by fill or other means to or above a minimum level of flood protection.

"Encroachment limits" means the boundaries of the floodway established in the flood plains and designating the width of the channel and minimum width of the overbank areas needed for the conveyance of the 100-year flood.

"Equal and opposite conveyance" means the location of development offsets from stream banks so that flood plain lands on each side of a stream convey a share of the flood flows proportionate to the total conveyance available on each respective side of the stream.

"Experienced Iowa flood chart" means a plot on logarithmic graph paper of points representing floods which have been observed and measured in Iowa and subsequently published by the U.S. geological survey or other agency. Each point on the plot is located with the drainage area in square miles as the abscissa and discharge in cubic feet per second as the ordinate.

"Flood control works" means physical works such as dams, levees, floodwalls, and channel improvements or relocations undertaken to provide moderate to high degree of flood protection to existing or proposed structures or land uses.

"Flood hazard area" means the area including the flood plains and the river or stream channel.

"Flood plain" means the land adjacent to a stream which has been or may be inundated by a flood having the magnitude of the regional flood as defined in these rules.

"Flood proofing" means a combination of structural provisions, changes, or adjustments in construction to buildings, structures, or properties subject to flooding primarily for the reduction or elimination of flood damages.

"Floodway fringe" means those portions of the flood plains located landward of the encroachment limits.

"Height of dam" means the vertical distance from the top of the dam to the natural bed of the stream or watercourse measured at the downstream toe of the dam or to the lowest elevation of the outside limit of the dam if it is not across a watercourse.

"High damage potential" means the flood damage potential associated with habitable residential buildings or industrial, commercial, or public buildings or building complexes of which flooding would result in high public damages as determined by the department.

"Low damage potential" means all buildings, building complexes or flood plain use not defined as maximum, high, or moderate damage potential.

"Low head dam" means any dam essentially contained within the channel of a river or stream and which is overtopped by normal stream flows.

"Major dam structure" means a dam meeting any of the following criteria:

1. Any high hazard dam.
2. Any moderate hazard dam with a permanent storage exceeding one hundred (100) acre-feet or a total of permanent and temporary storage exceeding two hundred fifty (250) acre-feet at the top of the dam elevation.
3. Any dam, including low hazard dams, where the height of the emergency spillway crest measured above the elevation of the channel bottom at the centerline of the dam (in feet) multiplied by the total storage volume (in acre-feet) to the emergency spillway crest elevation exceeds 30,000. For dams without emergency spillways, these measurements shall be taken to the top of dam elevation.

"Maximum damage potential" means the flood damage potential associated with hospitals and like institutions; buildings or building complexes containing documents, data, or instruments of great public value; buildings or building complexes containing materials dangerous to the public or fuel storage facilities; power installations needed in emergency or buildings or building complexes similar in nature or use to those listed above.

"Minimum level of flood protection" means the elevation corresponding to the water surface profile of the regulatory flood associated with a damage potential classification listed in these rules plus any freeboard specified in these rules.

"Mobile home" means a structure, transportable in one or more sections, which is built on a permanent chassis and designed to be used with or without a permanent foundation when connected to the required utilities. It does not include recreational vehicles or travel trailers.

"Moderate damage potential" means flood damage potential associated with industrial and commercial buildings or building complexes containing readily movable goods, equipment, or vehicles and seasonal residential buildings or building complexes which flooding would not result in high public damages as determined by the department.

"Nominated stream" means the stream or watercourse named in the petition described in chapter 72 of these rules that seeks designation of a stream as a protected stream.

"Permanent storage" means the volume of water expressed in acre-feet which is stored upstream from a dam or in an impoundment up the level of the principal outlet works of the structure.

"Probable maximum flood" means the flood that may be expected from the most severe combination of critical meterological and hydrologic conditions that are reasonably possible in the region, and is derived from probable maximum precipitation, the theoretical greatest depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year. The probable maximum precipitation within designated zones in Iowa has been determined by the National Weather Service. The probable maximum flood for any location within Iowa is determined by the department.

"Protected stream" means a stream designated by the department as a "protected stream" in chapter 72 of these rules.

"Public damages" means costs resulting from damage to roads and streets, sewers, water mains, other public utilities and public buildings; expenditures for emergency flood protection, evacuation and relief, rehabilitation and cleanup; losses due to interruption of utilities and transportation routes, and interruption of commerce and employment.

"Q100, Q50, Q25, Q15, Q10, et cetera" means a flood having a 1, 2, 4, 6, 7, 10, et cetera percent chance of being equalled or exceeded in any one year (100, 50, 25, 15, 10, et cetera year flood) as determined by the department.

"Regional flood" means a flood representative of the largest floods which have been observed on streams in Iowa.

"Repair and maintenance of a drainage district ditch" means the restoration of the original grade line, cross-sectional area, or other design specifications of a drainage district ditch lawfully established as part of a drainage district formed and operating under the provisions of Iowa Code chapter 468.

"Road projects" means the construction and maintenance of any bridges, culverts, road embankments, and temporary stream crossings.

"Rural areas" means any area not defined or designated as an urban area.

"Seasonal homes" means residential buildings or building complexes which are not used for permanent or year-around human habitation.

"Stream" means a watercourse that either drains an area of at least two square miles or has been designated as a protected stream in Chapter 72 of these rules.

"Temporary storage" means the volume of water expressed in acre-feet which may be stored upstream from a dam or in an impoundment above the level of the principal outlet works.

"Urban areas" means incorporated municipalities.

"Watercourse" means any lake, river, creek, ditch or other body of water or channel having definite banks and bed with visible evidence of the flow or occurrence of water, except such lakes or ponds without outlet to which only one landowner is riparian.

567—70.3(17A,455B,481A) Forms. The following forms are currently in use for flood plain projects.

Form 36: Application for Approval of Construction in or on any Floodway or Flood Plain. 4/87. 542-3234

Form 37: Notification of Completion of Construction. 1/87. 542-3017

567—70.4(17A,455B,481A) Requesting approval of flood plain development.

70.4(1) *Development needing approval.* Any development in a floodway or flood plain which exceeds the thresholds in Chapter 71 of these rules and is not otherwise regulated by a department flood plain management order or a department-approved, locally adopted flood plain management ordinance requires a department flood plain development permit.

70.4(2) *Applying for a flood plain development permit.* Application for a flood plain development permit shall be made on DNR Form 36 or a reasonable facsimile thereof. The application shall be submitted by or on behalf of the person or persons who have or will have responsibility by reason of ownership, lease, or easement for the property on which the project site is located. The application must be signed by the applicant or a duly authorized agent. Completed applications along with supporting information shall be mailed or otherwise delivered to the Flood Plain Management Section, Environmental Protection Division, Iowa Department of Natural Resources, Wallace State Office Building, Des Moines, Iowa 50319.

70.4(3) *Engineering plans.*

a. General requirement of certified plans. An application shall not be considered complete until sufficient engineering plans have been submitted to enable the department to determine whether the project as proposed satisfies applicable criteria. The engineering plans shall contain information specified by the department, including specifications, operation procedures and other information relating to environmental impacts. The engineering plans and other engineering information shall be certified by a registered professional engineer or, if applicable, a registered land surveyor, as required by Iowa Code chapter 542B. Duplicate copies of certified plans are required so that one copy can be returned to the applicant upon approval or disapproval of the application. An additional copy of the certified plans shall be required if the plans are incorporated as part of an approval or disapproval order which is filed with a county recorder.

b. Waiver of submission of certified plans. The department may waive the requirement in paragraph *"a"* of this subrule that the application for approval of a flood plain project be supported by certified engineering plans by making one of the following determinations:

(1) Engineering data are not required to determine that the project conforms to all applicable administrative and statutory criteria; or

(2) Adequate engineering data used to evaluate the dimensions and effects of the project were already available to the engineering staff.

70.4(4) *Application fee.* Reserved. No fee is charged at this time.

70.4(5) *Modification of application or plans.* Applicants and prospective applicants are encouraged to communicate with the department's staff before submitting plans to identify the data required for review of a project and to discuss project modifications reasonably required to make the project conform to applicable criteria. When staff review of submitted plans discloses need for plan modification to conform to one or more criteria, the applicant is encouraged to submit revised plans.

567—70.5(17A,455B,481A) Procedures for review of applications.

70.5(1) *Initial screening of applications.* Each application upon receipt shall be promptly evaluated by the department to determine whether adequate information is available to review the project. The department shall advise the applicant of any additional information required to review the project. If the requested information is not submitted within 60 days of the date the request is made, the department may consider the application withdrawn.

70.5(2) *Order of processing.* In general, complete applications including sufficient plans and specifications shall be reviewed in the order that complete information is received. However, when there are a large number of pending applications, which preclude the department from promptly processing all applications, the department may expedite review of a particular application out of order if the completed application and supporting documents were submitted at the earliest practicable time and any of the following conditions exist:

a. Relatively little staff review time (generally less than four hours) is required and delay will cause the applicant hardship:

b. The applicant can demonstrate that a delay in the permit will result in a substantial cost increase of a large project;

c. Prompt review of the permit would result in earlier completion of a project that conveys a significant public benefit;

d. The need for a permit is the result of an unforeseen emergency or catastrophic event; or

e. A permit is needed to complete a project that will abate or prevent an imminent threat to the public health and welfare.

70.5(3) *Project investigation.* The department shall make an investigation of a project for which an application is submitted. The following are standard procedures for an investigation of an application.

a. Inspection. Agency personnel may make one or more field inspections of the project site when necessary to obtain information about the project. Submission of the application is deemed to constitute consent by the applicant for the agency staff and its agents to enter upon the land on which the proposed activity or project will be located for the sole purpose of collecting the data necessary to process the application, unless the applicant indicates to the contrary on the application.

b. Technical review. The department staff shall conduct a technical review using appropriate analytical techniques such as application of hydrologic and hydraulic models to determine the effects and impacts of a proposed project.

c. Solicitation of expert comments on environmental effects. For channel changes or other development which may cause significant adverse effects on the wise use and protection of water resources, water quality, fish, wildlife and recreational facilities or uses, the department shall request comments from the fish and wildlife division of the department or other knowledgeable sources.

d. Summary report of project review. The department staff may, if indicated, prepare a project summary report which summarizes the results of the review with respect to relevant criteria, the analytical methods used in the review and other project information. Typical indications of when project summary reports will be prepared are for those projects for which negative comments have been received from potentially affected landowners, those projects which are not approvable, and those projects which are complex in nature. Project summary reports will not normally be prepared for routine, noncontroversial projects.

e. Notice to landowners who might be affected. Before an application for approval of a levee or channel change is approved the department shall require the applicant to provide the names of the owners and occupants of land located immediately upstream, downstream, and across from the project site, and owners of any other land which the agency staff determines may be adversely affected by the project. The department shall then notify the landowners that the project is under consideration and provide a reasonable opportunity for submission of comments. The requirements of this paragraph also apply to other types of flood plain development when the project review discloses that lands not controlled by the applicant may be adversely affected by the project.

f. Notice to the applicant that project does not conform to criteria. If the project review discloses that the project violates one or more criteria and that the project should be disapproved, or approved only subject to special conditions to which the applicant has not agreed, the department shall notify the applicant and, when practical, suggest appropriate project modifications. The department shall offer the applicant an opportunity to submit comments before an initial decision is made.

70.5(4) *Initial decision by the department.* The initial decision by the department on an application for a flood plain development permit shall be either approval or disapproval. The initial decision shall include a determination whether the project satisfied all relevant criteria and may incorporate by reference and attachment the summary report described in 70.5(3)"*d*" of these rules.

a. Approval. Issuance of a flood plain development permit shall constitute approval of a project. The permit shall include applicable general conditions listed in Chapter 72 of these rules and may include one or more special conditions when reasonably necessary to implement relevant criteria.

b. Disapproval. A letter to the applicant denying the application shall constitute disapproval of a project.

c. Notice of initial decision. Copies of the initial decision shall be mailed to the applicant, any person who commented pursuant to 70.5(3)"*e*," and any other person who has requested

a copy of the decision. The decision may be sent by ordinary mail, first class, and shall be accompanied by a certification of the date of mailing. An initial decision becomes the final decision of the department unless a timely notice of appeal is filed in accordance with 70.6(17A,455B,481A). The final decision may be filed with the appropriate county recorder to give constructive notice to future landowners of any conditions or requirements imposed by the final decision.

567—70.6(17A,455B,481A) Appeal of initial decision. Any person aggrieved by an initial decision issued under 70.5(17A,455B,481A) of these rules may file a notice of appeal with the director. The notice of appeal must be filed within 30 days following the certified date of mailing of the decision unless the appellant shows good cause for failure to receive actual notice and file within the allowed time. The form of the notice of appeal and appeal procedures are governed by Chapter 7 of these rules.

The department shall mail a copy of the notice of appeal to each person who was sent a copy of the initial decision. The department shall attach an explanation of the opportunity to seek intervention in the contested case.

These rules are intended to implement Iowa Code sections 17A.3, 455B.105, chapter 455B, division III, part 4, and 481A.15.

[Filed emergency 6/3/83—published 6/22/83, effective 7/1/83]
[Filed 12/2/83, Notices 6/22/83, 7/20/83—published 12/21/83, effective 1/25/84]
[Filed emergency 9/20/85—published 10/9/85, effective 9/20/85]
[Filed 11/1/85, Notice 6/19/85—published 11/20/85, effective 12/25/85*]
[Filed emergency 11/14/86—published 12/3/86, effective 12/3/86]
[Filed 7/22/88, Notice 5/18/88—published 8/10/88, effective 9/14/88]
[Filed 2/1/91, Notice 11/14/90—published 2/20/91, effective 3/27/91]
[Filed 10/22/93, Notice 8/18/93—published 11/10/93, effective 12/15/93]

*Effective date of definitions (channel change, drainage district ditch, repair and maintenance of a drainage district ditch) in rule 70.2 delayed seventy days by the administrative rules review committee.

CHAPTER 71
FLOOD PLAIN OR FLOODWAY DEVELOPMENT— WHEN APPROVAL IS REQUIRED

[Prior to 7/1/83, INRC, Ch 5, Div. II]
[Prior to 12/3/86, Water, Air and Waste Management(900)]

PREAMBLE: This chapter of these rules contains administrative thresholds which implement the statutory requirement that approval from the department be obtained for any development including construction, maintenance and use of a structure, dam, obstruction, deposit, excavation or "flood control work" on a flood plain or floodway. These administrative thresholds are organized into categories such as "channel changes", "levees or dikes", "buildings", etc. Any doubt concerning whether a project or activity requires approval under these thresholds should be resolved by requesting advice from the department.

The department may delegate regulatory authority to a local government by approving local flood plain regulations (see chapter 75 of these rules). To determine whether the department has delegated regulatory authority over a specific category of project at a specific location, an inquiry should be made to:

State Coordinator
National Flood Insurance Program
Department of Natural Resources
Wallace State Office Building
Des Moines, Iowa 50319
Ph: (515)281-8690

C-7

567—71.1(455B) Bridges, culverts, temporary stream crossings, and road embankments. Approval by the department for the construction, operation, and maintenance of bridges, culverts, temporary stream crossings, and road embankments shall be required in the following instances.

71.1(1) *Rural area—floodway.* In rural areas, bridges, culverts, road embankments, and temporary stream crossings in or on the floodway of any river or stream draining more than 100 square miles. (Note: Channel modifications associated with bridge, culvert or roadway projects may need approval; see 567—71.2(455B).

71.1(2) *Rural area—floodway and flood plain.* Road embankments located in the floodway or flood plains, but not crossing the channel of a river or stream draining more than ten square miles, where such works occupy more than three percent (3%) of the cross sectional area of the channel at bankfull stage or where such works obstruct more than fifteen percent (15%) of the total cross sectional area of the flood plain at any stage. In determining a fifteen percent (15%) occupancy of the flood plain, the concept of equal and opposite conveyance as defined in chapter 70 of these rules shall apply.

71.1(3) *Urban areas.* In urban areas bridges, culverts, road embankments and temporary stream crossings in or on the floodway or flood plains of any river or stream draining more than two (2) square miles.

567—71.2(455B) Channel changes. Approval by the department for the construction, operation, and maintenance of channel changes shall be required in the following instances.

71.2(1) *Rural areas.* In rural areas:

a. Channel changes not otherwise associated with road projects in or on the floodway of any stream draining more than ten (10) square miles at the location of the channel change.

b. Channel changes associated with road projects in or on the floodway of any stream draining more than ten (10) square miles at the location of the channel change whereby either (i) more than a five hundred (500) foot length of the existing channel is being altered or (ii) the length of existing channel being altered is reduced by more than twenty-five percent (25%).

71.2(2) *Urban areas.* In urban areas channel changes on any river or stream draining more than two (2) square miles at the location of the channel change.

71.2(3) *Protected streams.* Channel changes at any location on any river or stream designated as a protected stream pursuant to division III of chapter 72 of these rules.

71.2(4)* *Channel change by drainage district.* Rule 72.2(455B) applies to channel changes sponsored by a drainage district. However, approval is not required for repair and maintenance of a drainage district ditch as defined in 70.2(455B) if the drainage area of the ditch at the location of the proposed work is less than one hundred square miles.

This rule is intended to implement Iowa Code section 455B.275.

567—71.3(455B) Dams. Approval by the department for construction, operation, or maintenance of a dam in the floodway or flood plain of any watercourse shall be required when the dimensions and effects of such dam exceed the thresholds established by this rule. Exception: Public Road embankments with culverts which impound water only in temporary storage are exempt from the requirements of this rule and shall be reviewed under rules 71.1(455B) and 72.1(455B). Approval required by this rule shall be coordinated with approval for storage of water required by chapter 51 of these rules. Approval by the department shall be required in the following instances:

71.3(1) *Rural areas.* In rural areas:

a. Any dam designed to provide a sum of permanent and temporary storage exceeding 50 acre-feet at the top of dam elevation, or 25 acre-feet if the dam does not have an emergency spillway, and which has a height of five feet or more.

b. Any dam designed to provide permanent storage in excess of 18 acre-feet and which has a height of five feet or more.

c. Any dam across a stream draining more than ten square miles.

d. Any dam located within one mile of an incorporated municipality, if the dam has a height of ten feet or more, stores ten acre-feet or more at the top of dam elevation, and is situated such that the discharge from the dam will flow through the incorporated area.

71.3(2) *Urban areas.* Any dam which exceeds the thresholds in 71.3(1)*"a," "b" or "d."*

71.3(3) *Low head dams.* Any low head dam on a stream draining two (2) or more square miles in an urban area, or ten (10) or more square miles in a rural area.

71.3(4) *Modifications to existing dams.* Modification or alteration of any dam or appurtenant structure beyond the scope of ordinary maintenance or repair, or any change in operating procedures, if the dimensions or effects of the dam exceed the applicable thresholds in this rule. Changes in the spillway height or dimensions of the dam or spillway are examples of modifications for which approval is required.

71.3(5) *Mill dams.* Rescinded IAB 2/20/91, effective 3/27/91.

71.3(6) *Maintenance of preexisting dams.* Approval shall be required to maintain a preexisting dam as described in 567—chapter 73 only if the department determines that the dam poses a significant threat to the well-being of the public or environment and should therefore be removed or repaired and safely maintained. Preexisting dams are subject to the water, air and waste management dam safety inspection program as set forth in chapter 73.

This rule is intended to implement Iowa Code sections 455B.262, 455B.264, 455B.267, 455B.275 and 455B.277.

567—71.4(455B) Levees or dikes. Approval by the department for construction, operation, and maintenance of levees or dikes shall be required in the following instances.

71.4(1) *Rural areas.* In rural areas, any levees or dikes located on the flood plain or floodway of any stream or river draining more than ten (10) square miles.

71.4(2) *Urban areas.* In urban areas, any levee or dike along any river or stream draining more than two (2) square miles.

567—71.5(455B) Waste or water treatment facilities. Approval by the department for construction, operation, and maintenance of waste or water treatment facilities shall be required in the following instances.

71.5(1) *Rural areas.* In rural areas, any such facilities on the flood plains or floodway of any river or stream draining more than ten (10) square miles.

71.5(2) *Urban areas.* In urban areas, any such facilities on the flood plain or floodway of any river or stream draining more than two (2) square miles.

567—71.6(455B) Sanitary landfills. Approval by the department for construction, operation, and maintenance of any sanitary landfill shall be required in the following instances.

71.6(1) *Rural areas.* In rural areas, any such landfill located on the flood plain or floodway of any stream draining more than ten (10) square miles at the landfill site.

71.6(2) *Urban areas.* In urban areas, any such facilities located on the flood plain or floodway of any stream draining more than two (2) square miles at the landfill site.

C-8

567—71.7(455B) Buildings and associated fill. Approval by the department for construction, use and maintenance of "buildings" as defined in chapter 70 of these rules and for placement of fill is required as described in the following thresholds.

71.7(1) *Building and placement of associated fill in urban areas.* In urban areas as defined in these rules approval is required for construction, use and maintenance of buildings in the floodway or flood plain of any stream draining more than two (2) square miles at the location of the structure as follows:

a. New construction including fill for development purposes. Approval is required for construction of any new building. New construction includes replacement or relocation of an existing building. New construction also includes placement and grading of fill materials in a manner that would create an elevated building site.

b. Additions to existing buildings. Approval is required for any addition which increases the original floor area of a building by twenty-five percent (25%) or more. All additions constructed after July 4, 1965, shall be added to any proposed addition in determining whether the total increase in original floor space would exceed twenty-five percent (25%).

c. Lowering or elevating. Approval is required for lowering a floor of a building. Approval is not required for elevating an existing building. However, when a building is elevated the lowest floor should be elevated to the appropriate minimum protection level stated in 72.5(1) of these rules. The department, upon request, will cooperate in determining the minimum protection level for a person who proposes to elevate a building.

d. Reconstruction. Approval is required for reconstruction of any portion of a building if the cost of reconstruction exceeds fifty percent (50%) of the market value of the existing building or if reconstruction will increase the market value by more than fifty percent (50%).

71.7(2) *Buildings and associated fill located within two (2) miles of an urban area.* The thresholds for buildings and associated fill in subrule 71.7(1) shall apply to rural areas within two (2) miles of municipal corporate limits.

71.7(3) *Buildings and associated fill in all other rural areas.* In rural areas not covered by 71.7(1) the thresholds for approval of buildings and associated fill are the same as in 71.7(1) except that approval is required only when the drainage area at the location of the structure is more than ten (10) square miles.

71.7(4) *Buildings and associated fill adjacent to or downstream from impoundments.* Approval is required for new construction, additions, lowering, or reconstruction and associated fill as described in 71.7(1) without regard to the drainage area if the proximity of the building to a dam regulated by the department is as follows:

a. Adjacent to impoundment. Approval is required for a building and associated fill adjacent to an impoundment if the lowest floor level including any basement is lower than the top of the dam.

b. Downstream from dam. Approval is required for a building and associated fill downstream from a dam at any location where flooding can be reasonably anticipated from principal or emergency spillway discharges. If the dam does not substantially comply with high hazard criteria in these rules, approval is required for a building and associated fill at any location where flooding can be reasonably anticipated from overtopping and failure of the dam.

567—71.8(455B) Pipeline crossings. Approval by the department for the construction, operation and maintenance of buried pipeline crossings is not required if the natural contours of the channel and flood plain are maintained. (Note: Approval of streambank protection measures associated with pipeline crossings may need approval under 567—71.9(455B). Approval by the department for the construction, operation, and maintenance of all other pipeline crossings shall be required in the following instances:

71.8(1) *Rural areas.* In rural areas, pipeline crossings on any river or stream draining more than 100 square miles.

71.8(2) *Urban areas.* In urban areas pipeline crossings on any river or stream draining more than two square miles.

567—71.9(455B) Stream bank protective devices. Approval by the department for construction, operation, and maintenance of stream bank protective devices (including wing dikes, jetties, et cetera) shall be required in the following instances:

71.9(1) *Rural areas.* In rural areas:

a. All stream bank protective devices along any river or stream draining more than one hundred (100) square miles.

b. Stream bank protective devices along any river or stream draining between ten (10) and one hundred (100) square miles where the cross-sectional area of the river or stream channel is reduced more than three percent (3%).

71.9(2) *Urban areas.* In urban areas:

a. Stream bank protective devices along any river or stream draining more than one hundred (100) square miles.

b. Stream bank protective devices along any river or stream draining between two (2) and one hundred (100) square miles where the cross sectional area of the river or stream channel is reduced more than three percent (3%).

567—71.10(455B) Boat docks.

71.10(1) *In general.* Except as provided in subrule 71.10(2), department approval is required for all boat docks that are located in any stream other than a lake and do not float on the surface of the water.

71.10(2) *Exempted nonfloating boat docks.* Recreational nonfloating type boat docks located on the Mississippi and Missouri rivers, and the conservation pools of the Coralville, Rathbun, Red Rock, and Saylorville reservoirs shall not require department approval, other than a permit obtained from the parks, recreation and preserves division of the department.

567—71.11(455B) Excavations. Approval by the department for excavations shall be required in the following instances:

71.11(1) *Rural areas.* In rural areas:

*a.** Excavation in the channel on any river or stream draining more than ten (10) square miles where said excavation increases the cross sectional area of said channel below bankfull stage by more than ten percent (10%). The cross-sectional area of the channel shall be determined based on current engineering plans, or original engineering plans, if being performed by a drainage district. If an original plan is not available, the current engineering plan will be used to determine the original cross-sectional area of the channel. The drainage district shall submit a copy of the engineering plan for increasing the cross-sectional area of a channel to the department prior to approval by the board of supervisors or trustees regardless of size of the increase. The department shall submit its decision to the drainage district within sixty (60) days.

b. Excavation on any flood plain of any river or stream draining more than ten (10) square miles where said excavation is within one hundred (100) feet of the normal stream or river bank.

c. Excavation in relation to highway projects are exempt except as otherwise provided for in 71.1(1), 71.1(2) and 71.1(3).

*d.** Excavation for the repair and maintenance of a drainage district ditch as defined in 70.2(455B) is not considered an excavation within the intent of this rule if the drainage area of the ditch at the location of the proposed work is less than one hundred (100) square miles.

71.11(2) *Urban areas.* In urban areas excavations on the floodway of any stream draining more than two (2) square miles.

This rule is intended to implement Iowa Code section 455B.275.

567—71.12(455B) Miscellaneous structures, obstructions, or deposits not otherwise provided for in other rules. Approval by the department for construction, operation, and maintenance of miscellaneous structures, obstructions, or deposits, shall be required in the following instances.

71.12(1) *Rural areas.* In rural areas, any miscellaneous structures, obstructions, or deposits on the floodway or flood plain of any river or stream draining more than ten (10) square miles where such works obstruct more than three percent (3%) of the cross-sectional area of the stream channel at bankfull stage or where such works obstruct more than fifteen percent (15%) of the total cross-sectional area of the flood plain at any stage. In determining a fifteen percent (15%) obstruction of the flood plain, the concept of equal and opposite conveyance as defined in chapter 70 of these rules shall apply.

71.12(2) *Urban areas.* In urban areas, miscellaneous structures, obstructions, or deposits on the floodway or flood plains of any river or stream draining more than two (2) square miles.

[Filed 10/9/75, Notice 8/25/75—published 10/20/75, effective 11/24/75]
[Filed 5/5/78, Notice 3/8/78; Amended Notice 4/19/78—published 5/31/78, effective 7/5/78]
[Filed 9/14/78, Notice 7/12/78—published 10/4/78, effective 11/8/78]
[Filed 11/13/78, Notice 9/20/78—published 11/29/78, effective 1/3/79]
[Filed emergency 11/5/80—published 11/26/80, effective 11/5/80]
[Filed 2/23/82, Notice 12/9/81—published 3/17/82, effective 4/21/82]
[Filed 2/24/82, Notice 11/11/81—published 3/17/82, effective 4/21/82]
[Filed 4/23/82, Notice 11/11/81—published 5/12/82, effective 6/16/82]
[Filed 4/6/83, Notice 2/16/83—published 4/27/83, effective 6/30/83]
[Filed emergency 6/3/83—published 6/22/83, effective 7/1/83]
[Filed 12/2/83, Notice 6/22/83—published 12/21/83, effective 1/25/84]
[Filed 11/1/85, Notice 6/19/85—published 11/20/85, effective 12/25/85*]
[Filed emergency 11/14/86—published 12/3/86, effective 12/3/86]
[Filed 2/1/91, Notice 11/14/90—published 2/20/91, effective 3/27/91]

CHAPTER 72
CRITERIA FOR APPROVAL

[Prior to 7/1/83, INRC Ch 5, Div. III to V]
[Prior to 12/3/86, Water, Air and Waste Management[900]]

DIVISION I
SPECIAL CRITERIA FOR VARIOUS TYPES OF FLOOD PLAIN DEVELOPMENT

This division of these rules establishes administrative criteria which implement certain statutory criteria, policies, and principles in Iowa Code sections 455B.262, 455B.264, 455B.275 and 455B.277. The specific requirements in these rules must be met for approval of a project or activity in a flood plain or floodway. Additionally, the project or activity must satisfy all of the statutory criteria which sections 455B.262, 455B.264, 455B.275 and 455B.277 require the department to consider. Where a project or activity will result in effects which the department must by statute consider but which are not governed specifically by these rules, the department shall review such effects on a case-by-case basis to determine whether the project or activity meets the statutory criteria.

567—72.1(455B) Bridges and road embankments. The following criteria shall apply to the construction, operation, and maintenance of bridges and road embankments.

72.1(1) *Bridges and road embankments affecting low damage potential areas.* For bridges and road embankments affecting floodway or flood plain areas having a low flood damage potential, the following criteria will apply:

a. Backwater Q50. The maximum allowable backwater for Q50 and lesser floods is limited to 0.75 foot.

b. Backwater Q100. The maximum allowable backwater for Q100 is limited to 1.5 feet.

c. Freeboard. The minimum freeboard for low superstructure horizontal bridge members above Q50 is three feet.

72.1(2) *Bridges and road embankments affecting moderate damage potential areas.* For bridges and road embankments affecting floodway or flood plain areas occupied by buildings or building complexes having a moderate flood damage potential, the following criteria will apply:

a. The maximum allowable backwater for Q100 is limited to 1.0 foot.

b. The criteria specified in 72.1(1)"*a*" and "*c.*"

72.1(3) *Bridges and road embankments affecting high or maximum damage potential development.* For bridges and road embankments affecting floodway or flood plain areas occupied by buildings or building complexes having a high or maximum flood damage potential, the following criteria will apply:

a. Backwater effects are to be minimized for all stages which affect maximum or high flood damage potential buildings or building complexes or for all stages which would tend to reduce the level of protection of certain flood control works, unless acceptable remedial measures are provided or such buildings are removed or the uses relating to human occupancy are prohibited.

b. In no case shall the criteria specified in 72.1(1)"*a*" and "*c*" and 72.1(2)"*a*" be exceeded.

72.1(4) *Bridge and channel change.* For bridges and culverts involving channel changes on the floodway of any stream draining at the location of the channel change between ten (10) and one hundred (100) square miles whereby either (i) more than a five hundred (500) foot length of the existing channel is being altered or (ii) the length of existing channel being altered is reduced by more than twenty-five percent (25%), the maximum allowable backwater shall correspond to the limits permitted in 72.1(1), 72.1(2), 72.1(3) or 72.1(5) depending upon the associated damage potential.

72.1(5) *Culverts.* The maximum allowable backwater at culvert inlets shall correspond to the limits permitted in 72.1(1), 72.1(2), or 72.1(3) depending upon the damage potential associated with the affected area. In the case of replacement culverts the backwater shall not exceed that created by the culvert or waterway crossing being replaced or that specified in 72.1(1), 72.1(2), or 72.1(3) depending upon the associated damage potential, whichever is greater.

72.1(6) *Road embankments.* The criteria listed in 72.11(455B) of these rules for miscellaneous flood plain construction projects shall apply to road embankments located on the flood plain but not crossing any stream or river channel.

72.1(7) *Temporary channel obstructions.* Temporary stream crossings, and other temporary obstructions usually constructed, operated, and maintained during the construction phase of another flood plain construction project shall meet the following criteria:

a. Low flow. Said structures will provide for the passage of the prevailing flow in the stream or river.

b. Flood flow. Said structure shall be designed to fail or otherwise operate in the event of flooding so as to prevent premature overbank flow, or meet the backwater criteria indicated in 72.1(1), 72.1(2), or 72.1(3).

72.1(8) *Emergency.* Repairs or temporary construction required to maintain the operation of a bridge, roadgrade or culverts in time of emergency need not be submitted for prior department approval. Plans of such emergency or temporary construction shall be submitted to the department for review after the event causing the emergency has passed.

567—72.2(455B) Channel changes. The following criteria shall apply to channel changes.

72.2(1) *Percent reduction in length.*

a. Streams draining over 100 square miles. For streams (other than protected streams) draining more than one hundred square miles, no more than a ten percent (10%) reduction in the original length of the existing channel through any contiguous parcel(s) of the applicant(s) property will be allowed.

b. Rural streams draining 10 to 100 square miles. For streams (other than protected streams) draining between ten (10) and one hundred (100) square miles in rural areas, no more than a twenty-five percent (25%) reduction in the original length of the existing channel through any contiguous parcel(s) of the applicant(s) property will be allowed.

c. Urban streams draining 2 to 100 square miles. For streams (other than protected streams) draining between two (2) and one hundred (100) square miles in urban areas, no more than a twenty-five percent (25%) reduction in the original length of the existing channel through any contiguous parcel(s) of the applicant(s) property will be allowed.

d. Protected streams. For protected streams no channel changes will be allowed, because of actual or potential significant adverse effects on fisheries, water quality, flood control, flood plain management, wildlife habitat, soil erosion, public recreation, the public health, welfare and safety, compatibility with the state water plan, rights of other landowners, and other factors relevant to the control, development, protection, allocation, and utilization of the stream. Protected stream status does not prohibit bank stabilization measures; tree maintenance or removal; maintenance or installation of tile outlets; machinery crossings, including concrete drive-throughs and bridges; boat or canoe ramps; or other structures permitted by the department; nor restrict riparian access to the protected stream for such uses as livestock watering or grazing. Protected stream status does not affect current cropping practices or require the establishment or maintenance of buffer strips, filter strips or fences along protected streams.

72.2(2) *Capacity.* In the project reach, excavated channels shall have a discharge capacity equal to or greater than the existing channel. Excessive channel excavation will not be permitted.

72.2(3) *Alignments.* The alignments and dimensions of the excavated channel shall be such as to provide a smooth transition between the existing and the excavated channel.

72.2(4) *Velocities.* Velocities in the excavated channel shall not cause excessive erosion of the channel or banks, with the acceptable velocities being determined by the department. Energy dissipation structures, channel and bank protection, or other engineering measures may be required to eliminate excessive erosion of the channel or banks.

11-7

72.2(5) *Spoil disposition.* Disposition of spoil material from channel excavation of the flood plain shall be reviewed under miscellaneous flood plain construction.

72.2(6) *Increase in flood peak.* No significant increase in peak flood discharge will be permitted by the department. Floodwater retardance structures may be required to minimize any increase in peak flood discharges.

72.2(7) *Fish and wildlife habitat and public rights.* The channel change shall not have a significant adverse effect on fish and wildlife habitat or public rights to use of the stream. Conservation easements and other conditions may be required to mitigate potential damages to the quality of water, fish and wildlife habitat, recreational facilities, and other public rights.

72.2(8) *Soil erosion.* The tillage of land along the reach of a straightened stream shall be prohibited or modified when necessary to hold soil erosion to reasonable limits. Zones of land in which tillage shall be prohibited along the straightened reach shall be set on a case-by-case basis with consideration given to topography, soil characteristics, current use, and other factors affecting propensity for soil erosion. The tillage prohibition shall be recorded by the department in the office of the appropriate county recorder and shall run with the land against the applicant and all successors in interest to the land subject to the prohibition.

567—72.3(455B) Dams. The following criteria shall apply to dams which exceed the thresholds in 71.3(455B).

72.3(1) *General criteria for all regulated dams.*

a. Required findings. The department will approve the construction, operation or maintenance of a dam or modification of a dam or appurtenant structure only after finding that the project is designed in accordance with accepted engineering practice and methods and in a manner consistent with the applicable criteria and guidelines in department Bulletin No. 16, "Design Criteria and Guidelines for Iowa Dams," December 1990.

b. Anticipation of changed circumstances. In applying the approval criteria in subrule 72.3(1), paragraph *"a,"* consideration shall be given to both existing conditions and potential future conditions which can reasonably be anticipated at the time the application is reviewed.

c. Landowner notification. The department staff engineering review of the plans and specifications for a dam project shall determine whether there are lands upstream, downstream, or adjacent to the impoundment whose use apparently would be potentially adversely affected by maintenance of the dam and appurtenant structures, spillway discharges, temporary ponding of flood water behind the dam, or failure of the dam. It is the applicant's responsibility to submit sufficient information with the application and on request to enable the staff to accurately identify the owners and occupants of affected lands. The staff shall notify all known affected owners and occupants that the project may affect use of land in which they have an interest and advise them of their opportunity to be heard on the application. The project shall not be approved unless it appears that notice reasonably calculated to advise all owners and occupants has been given and that they have had an opportunity to be heard.

72.3(2) *Dams other than low head dams.* The following criteria shall apply to all dams other than low head dams:

a. Assignment of hazard class. Dams shall be assigned a hazard class based on the potential consequences of failure. Anticipated future land and impoundment use shall be considered in the determination of hazard class. The criteria in this subrule shall be used to determine hazard class regardless of the methodology used in engineering design of a dam. The hazard class shall determine the design requirements of the structure as outlined in department Bulletin No. 16. The hazard class shall be evaluated using the following criteria:

(1) *Low hazard.* A structure shall be classified as low hazard if located in an area where damages from a failure would be limited to loss of the dam, loss of livestock, damages to farm outbuildings, agricultural lands, and lesser used roads, and where loss of human life is considered unlikely.

(2) *Moderate hazard.* A structure shall be classified as moderate hazard if located in an area where failure may damage isolated homes or cabins, industrial or commercial buildings, moderately traveled roads or railroads, interrupt major utility services, but without substantial risk of loss of human life. In addition, structures where the dam and its impoundment are of themselves of public importance, such as dams associated with public water supply systems, industrial water supply or public recreation, or which are an integral feature of a private development complex, shall be considered moderate hazard for design and regulatory purposes unless a higher hazard class is warranted by downstream conditions.

(3) *High hazard.* A structure shall be classified as high hazard if located in an area where failure may create a serious threat of loss of human life or result in serious damage to residential, industrial or commercial areas, important public utilities, public buildings, or major transportation facilities.

(4) *Multiple dams.* Where failure of a dam could contribute to failure of a downstream dam or dams, the minimum hazard class of the dam shall not be less than that of any such downstream structure.

b. Lands, easements, and rights of way. An application for approval of a dam project shall include information showing the nature and extent of lands, easements, and rights of way which the applicant has acquired or proposes to acquire to satisfy the following criteria:

(1) Ownership or perpetual easements shall be obtained for the area to be occupied by the dam embankment, spillways, and appurtenant structures, and the permanent or maximum normal pool;

(2) Ownership or easements shall be obtained for temporary flooding of areas which would be inundated by the flood pool up to the top of dam elevation and for spillway discharge areas;

(3) Easements covering areas affected by temporary flooding or spillway discharges shall include provisions prohibiting the erection and usage of structures for human habitation or commercial purposes without prior approval by the agency;

(4) In locating the site of a dam and in obtaining easements and rights of way, the applicant shall consider the impacts which anticipated changes in land use downstream of a dam or adjacent to the impoundment could have on the hazard class of the dam, the operation of the dam, and the potential liability of the dam owner;

(5) The applicant may be required to acquire control over lands downstream from the dam as necessary to prevent downstream development which would affect the hazard class of the dam.

c. Other approvals required. The applicant shall comply with all applicable provisions of 567—chapters 51, 52 and 73 concerning water storage permits, operating permits, and inspections.

d. Additional requirements for major dam structures. Dams which are major dam structures as defined in chapter 70 of these rules must satisfy additional criteria set forth in Chapter VI of department Bulletin No. 16.

72.3(3) *Low head dams.* The following criteria shall apply to low head dams:

a. The location and design of a low head dam shall not adversely affect the fisheries or recreational use of the stream.

b. The pool created by a low head dam shall not adversely affect drainage on lands not owned or under easements by the applicant.

c. The structure shall be hydraulically designed to submerge before bank-full stage is reached in the stream channel in order that increased or premature overbank flooding does not occur. Where this cannot be reasonably accomplished in order for the structure to fulfill its intended purpose, the applicant shall demonstrate that any increased flooding will affect only lands owned or controlled by the applicant.

d. For projects which include significant appurtenant structures or works outside the stream channel, the combined effect of the total project shall not create more than one foot of

backwater during floods which exceed the flow capacity of the channel, unless the proper lands, easements, or rights of way are obtained.

e. The structure shall be capable of withstanding the effects of normal and flood flows across its crest and against the abutments, and adjacent channel or bank areas shall be protected against erosion as needed.

72.3(4) *Operating plan.* For any dam with movable structures which must operate or be operated during times of flood or to provide minimum downstream flow, or where the impoundment level is raised or lowered on a regular basis, an operating plan must be submitted for approval. The plan shall be in accordance with department Bulletin No. 16 and rules in 567—chapter 73.

This rule is intended to implement Iowa Code sections 455B.262, 455B.264, 455B.270, 455B.275 and 455B.277.

567—72.4(455B) Levees or dikes. The following criteria shall apply to levees or dikes.

72.4(1) *Agricultural levees or dikes.*

a. Level of protection. The permanent height of agricultural levees or dikes normally shall be limited that overtopping will occur due to discharges from Q10 to Q25 with the more comprehensive levee system being permitted the greater degree of protection.

b. Additional protection. Where it can clearly be shown that loss of valley storage caused by construction of the levee will not increase peak flood stages and discharges, the level of protection provided by the agricultural levee or dike may be increased beyond the Q10 to Q25 range.

c. Alignment. The location and alignment of agricultural levees or dikes shall be compatible with existing encroachment limits so that minimum flood protection levels will not be increased and said levee or dike alignment otherwise shall be consistent with the rules governing the location of encroachment limits set out in 75.4(455B) of these rules.

d. Maximum effect. The maximum increase in the flood profile resulting from the construction, operation, and maintenance of an agricultural levee or dike shall be one foot. Equal and opposite conveyance as defined in chapter 70 of these rules shall be used in determining the maximum increase in flood profile resulting from such levees or dikes.

e. Interior drainage. All agricultural levees or dikes shall be provided with adequate interior drainage facilities.

f. Offset. A minimum offset equal to one hundred (100) feet or twice the width of a river or stream measured from top of bank to top of bank, whichever distance is less, shall be required for all agricultural levees unless a greater offset is dictated by 72.4(1), paragraph *"c"* or *"d."*

72.4(2) *Flood control levees or dikes.*

a. Design level. The minimum design flood protection level for flood control levees or dikes shall correspond to the flood profile for Q100.

b. Freeboard. The levee or dike height shall provide for at least three (3) feet of freeboard above the design flood profile.

c. Alignment. The alignment of a flood control levee or dike shall be consistent with the rules governing the location of encroachment limits set out in 75.4(455B).

d. Interior drainage. Flood control levees or dikes shall provide for adequate interior drainage and ponding.

e. Design and specifications. The structural design and construction of flood control levees or dikes must be undertaken in accordance with accepted engineering and construction procedures and practices.

567—72.5(455B) Buildings. The following criteria apply to buildings.

72.5(1) *Minimum protection levels.* The minimum level of flood protection for a building depends on the damage potential of the building and contents. "Maximum", "high" and "moderate" damage potential classifications are defined in chapter 70 of these rules. Criteria for determining minimum levels of protection are as follows:

a. Buildings with maximum damage potential shall be protected to the level of a flood equivalent to Q500 plus one foot. Determination of the elevation of the department regional flood is recommended as an alternative to establish an appropriate level of protection for a building which has maximum damage potential (see discussion of flood frequencies and magnitudes in subrule 75.2(1).

b. Buildings with high damage potential shall be protected to the level of a flood equivalent to Q100 plus one foot.

c. Buildings with moderate damage potential shall be protected to the level of a flood equivalent to Q50.

d. Buildings adjacent to an impoundment shall be protected to the elevation of the top of the dam unless the dam has adequate spillway capacity to discharge the flood corresponding to the damage potential of the building at an elevation below the top of the dam.

e. Buildings downstream from a dam shall be protected to a level established by the department after due consideration of the hazards posed by the dam for buildings downstream.

72.5(2) *Flood protection methods.* The following flood protection methods are required for buildings to which a minimum flood protection level applies.

a. Structural design and flood proofing. Basement walls and floors below the applicable minimum flood protection level shall be structurally designed and constructed to be flood proof and able to withstand hydrostatic pressure and buoyant forces associated with a water table elevation equivalent to the minimum flood protection level. However, attached garages and storage space may be constructed below the applicable minimum protection level without flood proofing if all electrical circuit boxes, furnaces, and hot-water heaters are located above the applicable minimum protection level.

b. Sanitary sewer drains. Sanitary sewer drains below the applicable minimum flood protection level shall be provided with automatic closure valves to prevent back flow.

72.5(3) *Location.* The criteria for location of a building include consideration of the potential for obstructing flood flows and the potential hazards which may arise when the building is surrounded by flood water. Criteria for location of buildings in floodways and flood plains are as follows:

a. Obstruction. Buildings shall not be located in the floodway of a stream so as to result, individually or collectively, in any increase in the elevation of the 100-year flood as confined to the floodway. The floodway boundary applicable to an individual application shall be determined as necessary by the department in accordance with the criteria in rule 75.4(455B). Analysis of the effect that a building in the floodway would have on flood levels shall be based on the assumption that all similarly situated landowners would be allowed an equal degree of development in the floodway.

b. Public damages. Buildings shall be located to minimize public damages associated with isolation due to flooding of surrounding ground. In identifying the potential for public damages, the department shall determine whether there is a need for access passable by wheeled vehicles during the 100-year flood. The need for such access shall be determined on the basis of the criteria for evaluating flood warning and response time in subrule 75.2(3).

c. Existing buildings—replacement and improvements. In applying the criteria in paragraphs "*a*" and "*b*" of this subrule to projects which improve or replace existing lawful buildings the department shall give consideration to the policies for protection of existing development in rule 75.6(455B).

567—72.6(455B) Wastewater treatment facilities. The following criteria shall apply to wastewater treatment facilities.

72.6(1) *Location.* Wastewater treatment facilities shall not be located so as to individually or collectively conflict with 75.4(455B) governing the establishment of encroachment limits.

72.6(2) *Flood protection.* Flood protection for wastewater treatment facilities shall be provided to the level necessary for high damage potential buildings or building complexes unless evidence is submitted indicating the facility is of a lesser damage potential.

567—72.7(455B) Sanitary landfills. The following criteria shall apply to sanitary landfills.

72.7(1) *Location.* Sanitary landfills shall not be located so as to individually or collectively conflict with 75.4(455B) governing the establishment of encroachment limits.

72.7(2) *Flood protection.* Flood protection for the active working portion of the sanitary landfill shall be provided to the level necessary for high damage potential buildings or building complexes.

567—72.8(455B) Water supply treatment facilities. The following criteria shall apply to water supply treatment facilities.

72.8(1) *Location.* Water supply treatment facilities shall not be located so as to individually or collectively conflict with 75.4(455B) governing the establishment of encroachment limits.

72.8(2) *Flood protection.* Flood protection for water supply treatment facilities shall be provided to at least the level necessary for high damage potential buildings or building complexes.

567—72.9(455B) Stream protective devices. The following criteria shall apply to stream protective devices.

72.9(1) *Overflow.* Stream protective devices shall be constructed in a manner which will not cause premature overbank flow.

72.9(2) *Velocity.* Increased velocities resulting from the construction, operation, and maintenance of stream protective devices shall be limited so as not to cause excessive scour in the channel as determined by the department.

72.9(3) *Stability.* Stream protective devices shall be anchored securely to the bank or constructed in a stable manner so as not to become dislodged and result in the scattering of debris in adjacent and downstream reaches.

72.9(4) *Water quality and aesthetics.* Stream protective devices shall not adversely affect the water quality, fish and wildlife habitat or aesthetics of the stream.

567—72.10(455B) Pipeline river or stream crossings. The following criteria shall apply to pipeline river and stream crossings.

72.10(1) *Protection.* Pipeline river or stream crossings shall be sufficiently buried in the stream bed and banks or otherwise sufficiently protected to prevent rupture.

72.10(2) *Overflow and velocities.* Pipeline river or stream crossings shall be constructed, operated, and maintained so as not to create premature overbank flow or excessive scour to the channel or banks.

72.10(3) *Spoil.* Spoil material resulting from the construction of a pipeline crossing shall be disposed of in a manner which will not obstruct low flow or flood flows.

567—72.11(455B) Miscellaneous construction. The following criteria shall apply to miscellaneous construction.

72.11(1) *Structures, obstructions, or deposits.*

a. Location. Miscellaneous structures, obstructions, or deposits shall not be located so as to individually or collectively conflict with 75.4(455B) governing the establishment of encroachment limits.

b. Protection. Miscellaneous structures, obstructions, or deposits shall be provided with the minimum level of flood protection associated with the designated damage potential as indicated in 72.5(1) of these rules governing buildings and building complexes.

72.11(2) *Excavation.*

a. Spoil. Spoil material resulting from an excavation shall be disposed of in a manner consistent with 72.11(1)"*a*" of these rules pertaining to miscellaneous structures, obstructions, or deposits.

b. Levees. Levees protecting excavations shall meet the requirements of 72.11(1)"*a*" pertaining to miscellaneous structures, obstructions, or deposits.

c. Control of surface runoff into rock quarries. When the department investigates an application for approval of excavation of a quarry in carbonate rock on a flood plain or floodway, the department shall consider the potential for pollution of an underground watercourse or basin from drainage of surface water into the quarry. If available information including topographic and geologial information support a finding that drainage of surface water into the quarry would constitute a violation of the permit requirement in Iowa Code section 455B.268(3) and might cause pollution of an underground watercourse or basin if not controlled, then the department shall require that the applicant either request a permit under Iowa Code sections 455B.268(3) and 51.5(455B) of these rules to authorize drainage of surface water into the quarry, or construct and maintain a means of controlling drainage of surface water which would otherwise drain into the quarry.

These rules are intended to implement Iowa Code sections 455B.262, 455B.264, 455B.270, 455B.275 and 455B.277.

567—72.12 to 72.29 Reserved.

DIVISION II
GENERAL CRITERIA

567—72.30(455B) General conditions. Department orders approving an activity or project shall be subject to the following conditions.

72.30(1) *Maintenance.* The applicant and any successor in interest to the real estate on which the project or activity is located shall be responsible for proper maintenance.

72.30(2) *Responsibility.* No legal or financial responsibility arising from the construction or maintenance of the approved works shall attach to the state of Iowa or the agency due to the issuance of an order or administrative waiver.

72.30(3) *Lands.* The applicant shall be responsible for obtaining such government licenses, permits, and approvals, and lands, easements, and rights-of-way which are required for the construction, operation, and maintenance of the authorized works.

72.30(4) *Change in plans.* No material change from the plans and specifications approved by the department shall be made unless authorized by the department.

72.30(5) *Revocation of order.* A department order may be revoked if construction is not completed within the period of time specified in the department order.

72.30(6) *Performance bond.* A performance bond may be required when necessary to secure the construction, operation, and maintenance of approved projects and activities in a manner that does not create a hazard to the public's health, welfare, and safety. The amount and conditions of such bond shall be specified as special conditions in the department order.

567—72.31(455B) Variance.

72.31(1) *In general.* Where evidence is presented that additional private or significant public damage will not result from flood plain or floodway construction (other than channel changes) subject to regulation under Chapters 70 to 72 of these rules, the department may permit variance to the criteria stated in Chapter 72.

72.31(2) *Channel change variances.* The department may grant variances to the criteria stated in this chapter for channel changes (other than channel changes on protected streams) only in the following instances: (a) For comprehensive flood control projects in urban areas where channelization is the best alternative available; (b) for public projects such as roads or road grade protection where a channel change is the only reasonable and practicable alternative; (c) in cases whereby natural channel erosion has significant probability of eroding the structural stability of a building or other structure and bank erosion control measures are not feasible or practical under the circumstances; (d) in other cases where the applicant can clearly show that there are no adverse effects on the public interest.

C-14

72.31(3) *Protected stream channel change variance.* The department may grant variances to the prohibition of channel changes on protected streams for those cases listed in 72.31(2)"*b*," "*c*," and "*d*," but such variances will be with provisions for mitigation of environmental damage.

567—72.32(455B) Protected stream information. The following describes the variance procedure and the relation of hydrologically connected streams to protected streams:

72.32(1) *Protected streams variance procedure.* The variance shall be requested as part of the permit application and review process provided for in rules 567—70.3(17A,455B,481A) to 70.5(17A,455B,481A) and decisions on the variance request may be appealed in accordance with rule 70.6(17A,455B,481A). If the applicant is denied a permit to channelize a protected stream, the applicant may appeal to the environmental protection commission. The appeal will normally be heard by an administrative law judge but the applicant may request that the commission hear the appeal directly. If a proposed decision of an administrative law judge would affirm the denial of the permit, the applicant may appeal the administrative law judge's decision to the commission. If, on appeal, the commision affirms the denial of the permit, the applicant may appeal to the district court.

72.32(2) *Hydrologically connected streams.* Streams or waters that are hydrologically connected to protected streams are not protected streams unless specifically listed as protected streams in 72.50(2). The environmental protection commission considers the streams and waters that are hydrologically connected to streams proposed to become protected streams as one of the factors in the decision-making process to add streams to the list of protected streams in a rule-making procedure. Subrule 72.51(7) lists the other factors that affect the decision.

72.32(3) *Protected stream activities.* Protected stream status does not prohibit bank stabilization measures; tree maintenance or removal; maintenance or installation of tile outlets; machinery crossings, including concrete drive-throughs and bridges; boat or canoe ramps; or other structures permitted by the department; nor restrict riparian access to the protected stream for such uses as livestock watering or grazing. Protected stream status does not affect current cropping practices or require the establishment or maintenance of buffer strips, filter strips, or fences along protected streams except as may be required to mitigate environmental damage associated with a channel change on a protected stream.

567—72.33 to 72.49 Reserved.

DIVISION III
PROTECTED STREAM DESIGNATION PROCEDURE

567—72.50(455B) Protected streams.

72.50(1) *Protected streams defined.* Protected streams shall include streams designated as protected streams pursuant to the procedures of 72.51(455B), which upon designation will be listed in 72.50(2). Streams hydrologically connected to protected streams are not protected streams unless specifically listed as protected streams in 72.50(2).

**72.50(2)* *List of protected streams.* Streams designated as protected streams are the following:

ADAIR COUNTY

Middle River, east county line to confluence with unnamed creek (NE 1/4, S36, T76N, R30W, Adair Co.);

ALLAMAKEE COUNTY

Bear Creek, mouth (S1, T100N, R5W, Allamakee Co.) to west county line;

Clear Creek, mouth (S29, T99N, R3W, Allamakee Co.) to north line of S15, T100N, R5W;

*Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative Rules Review

Clear Creek, mouth (S35, T99N, R3W, Allamakee Co.) to west line of S25, T99N, R4W;
Cota Creek, mouth to west line of S10, T97N, R3W;
Dousman Creek, mouth (S33, T96N, R3W, Allamakee Co.) to south county line;
French Creek, mouth to east line of S23, T99N, R5W;
Hickory Creek, mouth to south line of S28, T96N, R5W;
Irish Hollow Creek, mouth to north line of S17, T100N, R4W;
Little Paint Creek, mouth to north line of S30, T97N, R3W;
Norfolk Creek, mouth to confluence with Teeple Creek (S24, T97N, R6W);
Paint Creek (a.k.a. Pine Creek), mouth (S9, T99N, R6W, Allamakee Co.) to west county line;
Paint Creek, mouth (S15, T96N, R3W, Allamakee Co.) to road crossing S18, T97N, R4W;
Patterson Creek, mouth to east line of S3, T98N, R6W;
Silver Creek, mouth to south line of S31, T99N, R5W;
Suttle Creek, mouth (S17, T96N, R4W, Allamakee Co.) to south county line;
Teeple Creek, mouth to north line of S11, T97N, R6W;
Trout Run, mouth in S16, T98N, R4W through one mile reach;
Unnamed tributary to Village Creek (a.k.a. Erickson Spring Branch), mouth to west line of S23, T98N, R4W;
Unnamed tributary to the Yellow River (a.k.a. Bear Creek), mouth to north line of S12, T96N, R5W;
Upper Iowa River, from Lane's Bridge at river mile 6 to west county line;
Village Creek, mouth to west line of S19, T98N, R4W;
Waterloo Creek, mouth (S35, T100N, R6W) to north county line;
Wexford Creek, mouth to west line of S25, T98N, R3W;
Yellow River, mouth to west county line;

APPANOOSE COUNTY

Chariton River, Highway 2 (S27, T69N, R17W, Appanoose Co.) to Rathbun Lake Dam (S35, T70N, R18W, Appanoose Co.);

BENTON COUNTY

Bear Creek, east county line to confluence with Opossum Creek (S 5/8, T84N, R9W, Benton Co.);

Bear Creek, mouth (S21, T86N, R10W, Benton Co.) to confluence with unnamed creek (NE 1/4, NE 1/4, S2, T86N, R10W, Benton Co.);
Cedar River, east county line to north county line;
Iowa River, south county line to west county line;
Lime Creek, mouth (S4, T86N, R10W, Benton Co.) to north county line;
Prairie Creek, mouth (S10, T85N, R10W, Benton Co.) to confluence with unnamed creek (S36, T86N, R10W, Benton Co.);
Salt Creek, mouth (S31, T82N, R12W, Benton Co.) to west county line;
Wild Cat Creek, mouth (S8, T84N, R9W, Benton Co.) to confluence with unnamed creek (W 1/2, S33, T84N, R10W, Benton Co.);
Wolf Creek, north county line to west county line;

BLACK HAWK COUNTY

Black Hawk Creek, mouth (S22, T89N, R13W, Black Hawk Co.) to west county line;
Cedar River, east county line to north county line;
Crane Creek, mouth (S26, T90N, R11W, Black Hawk Co.) to confluence with unnamed creek (S3, T90N, R12W, Black Hawk Co.);
Shell Rock River, mouth (S4, T90N, R14W, Black Hawk Co.) to north county line;
Wapsipinicon River, east county line to north county line;
West Fork Cedar River, mouth (S10, T90N, R14W, Black Hawk Co.) to west county line;
Wolf Creek, mouth (S19, T87N, R11W, Black Hawk Co.) to south county line;

BOONE COUNTY

Big Creek, south county line to confluence with unnamed creek (NW 1/4, S34, T82N, R25W, Boone Co.);
Bluff Creek, mouth (S22, T84N, R27W, Boone Co.) to Don Williams Lake Outlet (S5, T84N, R27W, Boone Co.);
Des Moines River, south county line to north county line;

BREMER COUNTY

Cedar River, south county line to north county line;
Shell Rock River, south county line to west county line;
Wapsipinicon River, south county line to north county line;

BUCHANAN COUNTY

Cedar River, south county line to west county line;
Lime Creek, south county line to confluence with unnamed creek (S1, T87N, R10W, Buchanan Co.);
South Fork Maquoketa River, east county line to confluence with major unnamed creek (S4, T90N, R7W, Buchanan Co.);
Wapsipinicon River, south county line to west county line;

BUENA VISTA COUNTY

Little Sioux River, north county line to north county line (entire length in county);
North Raccoon River, south county line to the north line of the NW 1/4, SE 1/4, S12, T90N, R36W, Buena Vista Co.;

BUTLER COUNTY

Shell Rock River, east county line to north county line;
West Fork Cedar River, east county line to west county line;

CALHOUN COUNTY

Camp Creek, mouth (S7, T86N, R34W, Calhoun Co.) to confluence with unnamed creek (NE 1/4, NE 1/4, S33, T87N, R34W, Calhoun Co.);
Cedar Creek, south county line to confluence with unnamed creek (S 1/2, S34, T86N, R32W, Calhoun Co.);
Lake Creek, mouth (S23, T86N, R34W, Calhoun Co.) to confluence with D.D. 13 (S33, T88N, R32W, Calhoun Co.);
North Raccoon River, south county line to west county line;

NOTE: Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative

CARROLL COUNTY
Middle Raccoon River, south county line to confluence with unnamed creek (SE 1/4, S15, T84N, R35W, Carroll Co.);
North Raccoon River, east county line to north county line;
CEDAR COUNTY
Cedar River, south county line to west county line;
Rock Creek, mouth (S2, T79N, R3W, Cedar Co.) to confluence with West Rock Creek (S11, T81N, R3W, Cedar Co.);
Sugar Creek, south county line to confluence with unnamed creek (S35, T80N, R2W, Cedar Co.);
Wapsipinicon River, east county line to north county line;
CERRO GORDO COUNTY
Beaverdam Creek, south county line to confluence with unnamed creek (S12, T95N, R22W, Cerro Gordo Co.);
Shell Rock River, east county line to north county line;
Spring Creek, mouth (S28, T97N, R20W, Cerro Gordo Co.) to confluence with Blair Creek (S9, T97N, R20W, Cerro Gordo Co.);
Willow Creek, mouth (S3, T96N, R20W, Cerro Gordo Co.) to confluence with Clear Creek (S16, T96N, R21W, Cerro Gordo Co.);
Winnebago River, east county line to west county line (entire length in county);
CHEROKEE COUNTY
Little Sioux River, south county line to north county line;
Maple River, south county line to confluence with unnamed creek (N 1/2, S29, T91N, R39W, Cherokee Co.);
Mill Creek, confluence with Willow Creek (S1, T93N, R41W, Cherokee Co.) to north county line;
CHICKASAW COUNTY
Cedar River, south county line to west county line;
Crane Creek, east county line to confluence with unnamed creek (NE 1/4, S25, T95N, R11W, Chickasaw Co.);
Little Cedar River, mouth (S20, T94N, R14W, Chickasaw Co.) to west county line;
Wapsipinicon River, south county line to north county line;
CLAY COUNTY
Little Sioux River, west county line to north county line (entire length in county);
Lost Island Outlet, mouth (S35, T96N, R36W, Clay Co.) to County Road M 54 (S24, T96N, R36W, Clay Co.);
Muddy Creek, mouth (S15, T96N, R36W, Clay Co.) to County Road B 17 (north line, S23, T97N, R36W, Clay Co.);
Ocheyedan River, mouth (S13, T96N, R37W, Clay Co.) to confluence with Stoney Creek (S7, T96N, R37W, Clay Co.);
Prairie Creek, mouth (S26, T96N, R36W, Clay Co.) to confluence with unnamed creek (SE 1/4, S35, T96N, R37W, Clay Co.);
Stoney Creek, mouth (S7, T96N, R37W, Clay Co.) to Highway 18 (S31, T96N, R37W, Clay Co.);
CLAYTON COUNTY
Bear Creek, mouth (S34, T92N, R4W, Clayton Co.) to west line of S23, T91N, R5W, Clayton Co.;
Bloody Run, mouth (S15, T95N, R3W) to source at Spook Cave;
Bloody Run Creek (a.k.a. Grimes Hollow), mouth (S36, T91N, R3W) to south county line;
Brownfield Creek, mouth to spring source (S31, T91N, R3W);
Buck Creek, mouth to west line of S9, T93N, R3W;

Cox Creek, mouth (S21, T92N, R5W, Clayton Co.) to south line S12, T91N, R6W, Clayton Co.;
Dry Mill Creek, mouth to west line of S9, T93N, R4W;
Elk Creek, mouth (S36, T92N, R4W, Clayton Co.) to south county line;
Ensign Creek, mouth (S28, T92N, R6W, Clayton Co.) to spring source (S29, T92N, R6W, Clayton Co.);
Hewett Creek, mouth to south line of S29, T92N, R6W;
Kleinlein Creek (a.k.a. Spring Creek), mouth to spring source (S10, T91N, R6W);
Maquoketa River, south county line to west county line;
Miners Creek, mouth to west line of S1, T92N, R3W;
Mink Creek, mouth (S30, T93N, R6W) to west county line;
Mossey Glen Creek, mouth (S3, T91N, R5W) to south line of S10, T91N, R5W, Clayton Co.;
North Cedar Creek, mouth (S8, T94N, R3W) to source;
Pecks Creek, mouth to south line of S15, T91N, R3W;
Pine Creek, mouth (S26, T91N, R4W) to confluence with Brownfield Creek (S25, T91N, R4W);
Point Hollow Creek (a.k.a. White Pine Creek), mouth (S31, T91N, R2W) to south county line;
Roberts Creek, mouth (S25, T93N, R5W, Clayton Co.) to confluence with unnamed creek (SE 1/4, S15, T95N, R6W, Clayton Co.);
Sny Magill Creek (a.k.a. Magill Creek), mouth to source;
South Cedar Creek (a.k.a. Cedar Creek), mouth (S33, T92N, R3W, Clayton Co.) to north line of S30, T93N, R4W, Clayton Co.;
Steeles Branch, mouth (S26, T91N, R4W) to south line S32, T91N, R4W, Clayton Co. (entire length in county);
Turkey River, confluence with Volga River to west county line;
Unnamed Tributary to Sny Magill Creek (a.k.a. West Fork Sny Magill Creek), mouth (S7, T94N, R3W) to west line of S7, T94N, R3W;
Volga River, mouth (S26, T92N, R4W, Clayton Co.) to west county line;
CLINTON COUNTY
Elk River, mouth (S20, T83N, R7E, Clinton Co.) to confluence with North Branch Elk River (S10, T83N, R6E, Clinton Co.);
Wapsipinicon River, mouth (S13, T80N, R5E, Clinton Co.) to west county line (entire length in county);
CRAWFORD COUNTY
Boyer River, south county line to north county line;
DALLAS COUNTY
Des Moines River, east county line to north county line (entire length in county);
Middle Raccoon River, mouth (S9, T78N, R29W, Dallas Co.) to west county line (entire length in county);
North Raccoon River, mouth (S21, T78N, R27W, Dallas Co.) to north county line (S5, T81N, R29W, Dallas Co.) (entire length in county);
Raccoon River, east county line to confluence with North Raccoon River (S21, T78N, R27W, Dallas Co.);
DAVIS COUNTY
Des Moines River, east county line to north county line (entire length in county);
DECATUR COUNTY
Thompson River, Highway 69 (S35, T68N, R26W, Decatur Co.) to west county line;
DELAWARE COUNTY
Bloody Run Creek (a.k.a. Grimes Hollow), north county line to spring source (S3, T90N, R3W);

C-16

Coffins Creek, mouth (S19, T89N, R5W, Delaware Co.) to confluence with Prairie Creek (S29, T89N, R6W, Delaware Co.);
Elk Creek, north county line to confluence with unnamed creek (center, S13, T90N, R4W, Delaware Co.);
Fenchel Creek, mouth (S5, T90N, R6W) to Richmond Springs (center of S4, T90N, R6W);
Fountain Spring Creek (a.k.a. Odell Branch), mouth (SE 1/4, S10, T90N, R4W) to confluence with South Branch Fountain Spring Creek (SE 1/4, S16, T90N, R4W);
Little Turkey River, north county line to south line of S11, T90N, R3W;
Maquoketa River, south county line to north county line;
Sand Creek, mouth (S9, T88N, R5W, Delaware Co.) to confluence with major unnamed creek (SW 1/4, S11, T88N, R6W, Delaware Co.);
Schechtman Branch, mouth to south line of S14, T90N, R4W;
South Branch Fountain Spring Creek, mouth (S16, T90N, R4W) to spring source (S16, T90N, R4W);
South Fork Maquoketa River, mouth (S16, T90N, R6W, Delaware Co.) to west county line;
Spring Branch, mouth (S10, T88N, R5W) to major spring source, north of Highway 20 (S35, T89N, R5W, Delaware Co.);
Steeles Branch, north county line to west line of S5, T90N, R4W, Delaware Co. (entire length in county between S4, T90N, R4W and west line of S5, T90N, R4W);
Twin Springs Creek, mouth (S2, T90N, R4W) to spring source (S12, T90N, R4W);

DES MOINES COUNTY
Cedar Creek, mouth (S1, T69N, R5W, Des Moines Co.) to Geode Lake Dam;
Cedar Creek, west county line to confluence with unnamed creek (S18, T70N, R4W, Des Moines Co.);
Flint Creek, mouth (S28, T70N, R2W, Des Moines Co.) to confluence with unnamed creek (NW 1/4, S21, T71N, R4W, Des Moines Co.);
Skunk River, mouth (S8, T68N, R2W, Des Moines Co.) to east county line (entire length in county);

DICKINSON COUNTY
Little Sioux River, south county line to confluence with West Fork Little Sioux River (S7, T99N, R37W, Dickinson Co.);

DUBUQUE COUNTY
Bloody Run, mouth (S34, T90N, R2E) to west line of S21, T90N, R2E;
Catfish Creek, mouth (S5, T88N, R3E, Dubuque Co.) to source;
Cloie Branch, mouth (S5, T89N, R2E) to west line of S5, T89N, R2E;
Hogans Branch, mouth (S35, T89N, R1W) to west line of S9, T88N, R1W;
Little Maquoketa River, mouth (S26, T90N, R2E, Dubuque Co.) to north line of NE 1/4, S5, T88N, R1W, Dubuque Co.;
Middle Fork Little Maquoketa River, west line of S31, T90N, R1E to north line of S33, T90N, R1W;
Point Hollow Creek (a.k.a. White Pine Creek), north county line to spring source (S8, T90N, R2W);
Tete des Morts Creek (a.k.a. Tete des Morts River), mouth (S34 T88N, R4E, Dubuque Co.) to south county line (S34, T88N, R4E, Dubuque Co.);

EMMET COUNTY
Brown Creek, mouth (S24, T99N, R34W, Emmet Co.) to Highway 9 (S13, T99N, R34W, Emmet Co.);
Des Moines River, south county line to north county line;
East Fork Des Moines River, east county line to Tuttle Lake Outlet (S13, T100N, R32W, Emmet Co.);

FAYETTE COUNTY
Bass Creek, mouth (S3, T95N, R9W) to west line of S3, T95N, R9W;

NOTE: Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative Rules Review Committee at their meeting held February 14, 1994.

Bear Creek, mouth to west line of S6, T92N, R7W;
Bell Creek, mouth (S10, T94N, R7W) to west line of S8, T94N, R7W;
Brush Creek, mouth (S26, T93N, R7W, Fayette Co.) to east line of S17, T92N, R7W, Fayette Co.;
Crane Creek, mouth (S31, T95N, R9W, Fayette Co.) to west county line;
Grannis Creek, mouth (S30, T93N, R7W) to west line of S36, T93N, R8W, Fayette Co.;
Little Turkey River, mouth (S18, T95N, R8W, Fayette Co.) to north county line;
Maquoketa River, east county line to north line of S24, T91N, R7W;
Mink Creek, east county line to west line of S15, T93N, R7W;
North Branch Volga River, mouth (S33, T93N, R9W, Fayette Co.) to confluence with unnamed creek (S8, T93N, R9W, Fayette Co.);
Otter Creek, mouth to confluence with unnamed tributary (a.k.a. Glovers Creek) in S22, T94N, R8W;
Turkey River, east county line to north county line;
Unnamed tributary to Otter Creek (a.k.a. Glovers Creek), mouth (S22, T94N, R8W) to west line of S15, T94N, R8W;
Volga River, east county line to confluence with unnamed creek (NW 1/4, NE 1/4 of S24, T93N, R10W, Fayette Co.);

FLOYD COUNTY
Cedar River, east county line to north county line;
Little Cedar River, east county line to north county line;
Rock Creek, mouth (S24, T97N, R17W, Floyd Co.) to north county line (entire length in county);
Shell Rock River, south county line to west county line;
Winnebago River, mouth (S14, T95N, R18W, Floyd Co.) to west county line;

FRANKLIN COUNTY
Beaver Creek, east county line to road crossing (S28, T90N, R19W, Franklin Co.);
Beaverdam Creek, mouth (S19, T93N, R19W, Franklin Co.) to north county line;
Iowa River, south county line to west county line (entire length in county);
Maynes Creek, confluence with unnamed creek (S12, T91N, R19W, Franklin Co.) to confluence with unnamed creek (S30, T91N, R20W, Franklin Co.);
Otter Creek, mouth (S28, T92N, R19W, Franklin Co.) to County Road C 23 (north line of S31, T93N, R20W, Franklin Co.);
West Fork Cedar River, east county line to confluence with Beaverdam & Bailey Creeks (S19, T93N, R19W, Franklin Co.);

GREENE COUNTY
Cedar Creek, mouth (S33, T85N, R32W, Greene Co.) to north county line;
North Raccoon River, south county line to west county line (entire length in county);

GRUNDY COUNTY
Black Hawk Creek, east county line to confluence with Minnehaha Creek (S7, T87N, R16W, Grundy Co.);
Wolf Creek, east county line to confluence with unnamed creek (S32, T86N, R17W, Grundy Co.);

GUTHRIE COUNTY
Middle Raccoon River, Lake Panorama (S15, T80N, R31W, Guthrie Co.) to north county line;
Middle Raccoon River, east county line to Lake Panorama Outlet (S31, T80N, R30W, Guthrie Co.);

HAMILTON COUNTY
Boone River, west county line to north county line;
Des Moines River, west county line to west county line (entire length in county);
Eagle Creek, mouth (S6, T89N, R25W, Hamilton Co.) to north county line;
White Fox Creek, mouth (S33, T89N, R25W, Hamilton Co.) to north county line;

NOTE: Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative Rules Review Committee at their meeting held February 14, 1994.

HANCOCK COUNTY
East Fork Iowa River, south county line to confluence with Galls Creek (S12, T95N, R24W, Hancock Co.);
West Fork Iowa River, south county line to County Road B 55 (north line of S31, T95N, R24W, Hancock Co.);
Winnebago River, east county line to north county line (entire length in county);
HARDIN COUNTY
Iowa River, south county line to north county line;
School Creek, mouth (S28, T89N, R20W, Hardin Co.) to confluence with unnamed creek (S16, T89N, R20W, Hardin Co.);
South Fork Iowa River, mouth (S4, T86N, R19W, Hardin Co.) to Highway 359 (S11, T88N, R22W, Hardin Co.);
HENRY COUNTY
Cedar Creek, mouth (S9, T71N, R7W, Henry Co.) to west county line (entire length in county);
Cedar Creek, upper extent of Geode Lake (S25, T70N, R5W, Henry Co.) to east county line;
Crooked Creek, west county line to north county line;
Skunk River, south county line to west county line (NW 1/4, S30, T73N, R7W, Henry Co.)(entire length in Henry Co.);
HOWARD COUNTY
Beaver Creek, mouth to south line of S29, T100N, R13W;
Bohemian Creek, east county line to west line of S2, T97N, R11W;
Chialk Creek, mouth (S1, T98N, R11W, Howard Co.) to north line S36, T99N, R11W, Howard Co.;
Nichols Creek (a.k.a. Bigalks Creek), east county line to west line of S23, T100N, R11W;
Staff Creek, mouth to west line of S27, T100N, R14W;
Turkey River, from east county line to confluence with South Branch Turkey River (S2, T98N, R12W, Howard Co.);
Upper Iowa River, all of the river located in Howard County;
Wapsipinicon River, south county line to west county line;
HUMBOLDT COUNTY
Des Moines River, south county line to north line S7, T92N, R30W, Humboldt Co.;
East Fork Des Moines River, mouth (S19, T91N, R28W, Humboldt Co.) to north county line;
IDA COUNTY
Little Sioux River, west county line to north county line;
Maple River, west county line to north county line;
IOWA COUNTY
Iowa River, east county line to north county line;
JACKSON COUNTY
Brush Creek, north line of S23, T85N, R3E to north line of S1, T85N, R3E;
Cedar Creek, mouth (S30, T85N, R3E) to east line of S29, T85N, R3E;
Little Mill Creek, mouth to west line of S29, T86N, R4E;
Maquoketa River, mouth (S7, T85N, R6E, Jackson Co.) to west county line (entire length in county);
Mill Creek, mouth (S18, T86N, R5E, Jackson Co.) to confluence with unnamed creek (S1, T86N, R3E, Jackson Co.);
Mineral Creek, mouth (S32, T85N, R1E, Jackson Co.) to west county line;
Ozark Spring Run, mouth (S32, T86N, R1E) to spring source in center of S32, T86N, R1E;
Pleasant Creek (a.k.a. Springbrook), confluence with unnamed creek (E 1/2, S11, T85N, R4E, Jackson Co.) to west line S15, T85N, R4E, Jackson Co.;
South Fork Big Mill Creek, mouth (S8, T86N, R4E, Jackson Co.) to west line S17, T86N, R4E, Jackson Co.;

NOTE Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative

81-7

Storybrook Hollow, mouth (S7, T86N, R4E, Jackson Co.) to south line S12, T86N, R3E, Jackson Co.;
Tete des Morts Creek (a.k.a. Tete des Morts River), north county line (S3, T87N, R4E, Jackson Co.) to confluence with unnamed creek (NW 1/4, S4, T87N, R3E, Jackson Co.);
Unnamed Creek, mouth (S1, T86N, R3E, Jackson Co.) to west line S1, T86N, R3E, Jackson Co.;
Unnamed tributary to Lytle Creek, mouth (S7, T86N, R2E) to west line of S11, T86N, R1E;
JEFFERSON COUNTY
Crooked Creek, mouth (S1, T73N, R8W, Jefferson Co.) to east county line;
Skunk River, east county line (east line, S13, T72N, R8W, Jefferson Co.) to north county line (north line, S1, T73N, R8W, Jefferson Co.)(entire length in Jefferson Co.);
JOHNSON COUNTY
Cedar River, east county line to north county line;
Clear Creek, Interstate 380 (S34, T80N, R7W, Johnson Co.) to confluence with unnamed creek (S29, T80N, R8W, Johnson Co.);
Iowa River, south county line (south line, S32, T77N, R5W, Johnson Co.) to Coralville Dam (S22, T80N, R6W, Johnson Co.);
North Branch Old Mans Creek, mouth (S31, T79N, R7W, Johnson Co.) to north line S23, T79N, R8W, Johnson Co.;
JONES COUNTY
Buffalo Creek, mouth (S10, T84N, R4W, Jones Co.) to west county line;
Maquoketa River, east county line to north county line (entire length in county);
Mineral Creek, east county line to west line S29, T85N, R1W, Jones Co.;
Wapsipinicon River, south county line to west county line;
KEOKUK COUNTY
North Skunk River, mouth (S5, T74N, R10W, Keokuk Co.) to west county line;
Skunk River, east county line to confluence with North & South Skunk Rivers (S5, T74N, R10W, Keokuk Co.);
South English River, east county line to confluence with unnamed creek (S6, T77N, R13W, Keokuk Co.);
South Skunk River, mouth (S5, T74N, R10W, Keokuk Co.) to confluence with Olive Branch Creek (S30, T75N, R13W, Keokuk Co.);
KOSSUTH COUNTY
Buffalo Creek, mouth (S20, T97N, R28W, Kossuth Co.) to confluence with North Buffalo Creek (S4, T97N, R27W, Kossuth Co.);
East Fork Des Moines River, south county line to west county line;
LEE COUNTY
Des Moines River, mouth (S34 T65N, R5W, Lee Co.) to west county line (entire length in county);
Skunk River, mouth (S8, T68N, R2W, Lee Co.) to north county line (entire length in county);
LINN COUNTY
Bear Creek, mouth (S21, T84N, R8W, Linn Co.) to west county line;
Buffalo Creek, east county line to Highway 13 (S10, T86N, R6W, Linn Co.);
Cedar River, south county line to west county line;
East Otter Creek, confluence with Otter Creek (S7, T84N, R7W, Linn Co.) to confluence with unnamed creek (S 1/2, S28, T85N, R7W, Linn Co.);
Wapsipinicon River, east county line to north county line;
LOUISA COUNTY
Cedar River, mouth (S20, T75N, R4W, Louisa Co.) to north county line;
Iowa River, mouth to north county line (NW 1/4, S6, T76N, R5W, Louisa Co.) (entire length in county);
Long Creek, mouth (S1, T74N, R4W, Louisa Co.) to west county line;

NOTE Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative

LUCAS COUNTY
Chariton River, Rathbun Lake (S34, T71N, R20W, Lucas Co.) to Highway 14 (S31, T72N, R21W, Lucas Co.);
White Breast Creek, north county line to confluence with unnamed creek (W 1/2, NW 1/4, S6, T71N, R23W, Lucas Co.);
Wolf Creek, mouth (S15, T71N, R21W, Lucas Co.) to confluence with unnamed creek (NE 1/4, S36, T71N, R22W, Lucas Co.);
LYON COUNTY
Big Sioux River, south county line to north county line;
Little Rock River, mouth (S35, T98N, R46W, Lyon Co.) to confluence with unnamed creek (S10, T98N, R44W, Lyon Co.);
Otter Creek, mouth (S21, T98N, R44W, Lyon Co.) to south county line;
Rock River, south county line to north county line;
MADISON COUNTY
Middle River, east county line to west county line;
Thompson River, south county line to confluence with unnamed creek (NW 1/4, S7, T74N, R29W, Madison Co.);
MAHASKA COUNTY
Des Moines River, south county line to west county line (entire length in county);
North Skunk River, east county line to north county line;
MARION COUNTY
Des Moines River, east county line to west county line (entire length in county);
White Breast Creek, mouth to west county line;
MARSHALL COUNTY
Iowa River, east county line to Marshalltown Center St. Dam (S26, T84N, R18W, Marshall Co.);
Iowa River, confluence with Dowd Creek (S2, T85N, R19W, Marshall Co.) to north county line;
Minerva Creek, mouth (S2, T84N, R19W, Marshall Co.) to confluence with major unnamed creek (NW 1/4, S9, T85N, R20W, Marshall Co.);
Wolf Creek, north county line to north county line (S2, T85N, R17W, Marshall Co.) (entire length in county);
MITCHELL COUNTY
Beaver Creek, mouth to north line of S19, T99N, R15W;
Burr Oak Creek, mouth (S12, T98N, R16W, Mitchell Co.) to north line of S5, T98N, R16W, Mitchell Co.;
Cedar River, south county line to north county line;
Deer Creek, mouth (S23, T99N, R18W, Mitchell Co.) to west county line;
Little Cedar River, south county line to north county line;
Rock Creek, south county line (S14, T97N, R17W, Mitchell Co.) to north line of S26, T98N, R18W, Mitchell Co. (entire length in county between south line of S14, T97N, R17W and north line of S26, T98N, R18W);
Spring Creek, mouth to north line of S8, T97N, R16W;
Turtle Creek, mouth to east line of S7, T99N, R17W;
Wapsipinicon River, east county line to north line of S20, T100N, R15W;
MONONA COUNTY
Maple River, south line (S34, T85N, R43W, Monona Co.) to north county line;
MONROE COUNTY
Des Moines River, east county line to north county line (entire length in county);
MUSCATINE COUNTY
Cedar River, south county line to north county line;

NOTE: Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative [illegible] Committee at their meeting held February 14, 1994.

61-2

Pine Creek, mouth (S21, T77N, R1E, Muscatine Co.) to confluence with unnamed creek (S26, T78N, R1W, Muscatine Co.);
Sugar Creek, mouth (S17, T78N, R2W, Muscatine Co.) to north county line;
O'BRIEN COUNTY
Little Sioux River, south county line to east county line;
Mill Creek, south county line to confluence with unnamed creek (NE 1/4, S9, T95N, R41W, O'Brien Co.);
PLYMOUTH COUNTY
Big Sioux River, south county line to north county line;
POLK COUNTY
Big Creek, upper extent of Big Creek Lake (S9, T81N, R25W, Polk Co.) to north county line;
Des Moines River, east county line to west county line (entire length in county);
Raccoon River, mouth (S10, T78N, R24W, Polk Co.) to west county line;
RINGGOLD COUNTY
Thompson River, east county line to north county line;
SAC COUNTY
Boyer River, south county line to confluence with unnamed creek (S6, T89N, R37W, Sac Co.);
Indian Creek, mouth (S24, T87N, R36W, Sac Co.) to north line (S20, T87N, R36W, Sac Co.);
North Raccoon River, east county line to north county line;
SCOTT COUNTY
Lost Creek, mouth (S15, T80N, R5E, Scott Co.) to confluence with unnamed creek (NW 1/4, S7, T79N, R5E, Scott Co.);
Wapsipinicon River, mouth (S13, T80N, R5E, Scott Co.) to north county line (NE 1/4, S1, T80N, R1E, Scott Co.) (entire length in county);
SIOUX COUNTY
Big Sioux River, south county line to north county line;
Rock River, mouth (S1, T95N, R48W, Sioux Co.) to north county line;
STORY COUNTY
South Skunk River, confluence with Squaw Creek (S12, T83N, R24W, Story Co.) to north county line;
TAMA COUNTY
Iowa River, east county line to west county line;
Raven Creek, mouth (S25, T83N, R16W, Tama Co.) to confluence with unnamed creek (S6, T82N, R16W, Tama Co.);
Salt Creek, east county line to confluence with South Branch Salt Creek (S29, T84N, R13W, Tama Co.);
UNION COUNTY
Thompson River, south county line to north county line;
Twelve Mile Creek, mouth (S36, T71N, R28W, Union Co.) to Twelve Mile Lake Dam (S12, T72N, R30W, Union Co.);
VAN BUREN COUNTY
Cedar Creek, east county line (SE 1/4, S12, T70N, R8W) to east county line (NE 1/4, S12, T70N, R8W);
Des Moines River, south county line to west county line (entire length in county);
WAPELLO COUNTY
Des Moines River, south county line to west county line (entire length in county);
South Avery Creek, mouth (S31, T73N, R14W, Wapello Co.) to west county line;
WARREN COUNTY
Des Moines River, east county line to north county line (entire length in county);
Middle River, confluence with Clanton Creek (S28, T76N, R25W, Warren Co.) to west county line;
White Breast Creek, east county line to south county line;

NOTE: Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative [illegible] Committee at their meeting held February 14, 1994.

WASHINGTON COUNTY
Crooked Creek, south county line to confluence with East and West Fork Crooked Creeks (S24, T74N, R7W, Washington Co.);
English River, mouth (S11, T77N, R6W, Washington Co.) to confluence with South English River (S6, T77N, R9W, Washington Co.);
Iowa River, east county line (east line, S36, T77N, R6W, Washington Co.) to north county line (north line, S2, T77N, R6W, Washington Co.) (entire length in Washington Co.);
Long Creek, east county line to confluence with South Fork Long Creek (S26, T75N, R6W, Washington Co.);
Skunk River, south county line (SE 1/4, S36, T74N, R8W, Washington Co.) to west county line (SW 1/4, S6, T74N, R9W, Washington Co.) (entire length in county);
South English River, mouth (S6, T77N, R9W, Washington Co.) to west county line;
WEBSTER COUNTY
Boone River, mouth (S36, T87N, R27W, Webster Co.) to east county line;
Brushy Creek, west line (S16, T88N, R27W, Webster Co.) to confluence with unnamed creek (S8, T88N, R27W, Webster Co.);
Brushy Creek, mouth (S15, T87N, R27W, Webster Co.) to south line S34, T88N, R27W, Webster Co.;
Deer Creek, mouth (S24, T90N, R29W, Webster Co.) to north line S16, T90N, R29W, Webster Co.;
Des Moines River, south county line to north county line (entire length in county);
Lizard Creek, mouth (S19, T89N, R28W, Webster Co.) to confluence with D.D. #3 (S35, T90N, R30W, Webster Co.);
South Branch Lizard Creek, mouth (S23, T89N, R29W, Webster Co.) to west line S32, T89N, R29W, Webster Co.;
WINNEBAGO COUNTY
Winnebago River, south county line to north county line;
WINNESHIEK COUNTY
Bear Creek (a.k.a. South Bear Creek), east county line to source (a.k.a. Mestad Springs, S29, T100N, R7W);
Bohemian Creek, mouth to west county line;
Canoe Creek, mouth (S25, T99N, R7W, Winneshiek Co.) to west line of S8, T99N, R8W, Winneshiek Co.;
Coon Creek, mouth to road crossing in NW 1/4, S13, T98N, R7W;
Dry Run, mouth to west line of S36, T98N, R9W;
East Pine Creek, mouth (S28, T100N, R9W) to north county line (S10, T100N, R9W);
Martha Creek, mouth to west line of S13, T99N, R10W;
Middle Bear Creek, mouth to north line of S16, T100N, R7W;
Nichols Creek (a.k.a. Bigalk Creek), mouth to west county line;
North Bear Creek, mouth to north county line;
North Canoe Creek, mouth to north line of S2, T99N, R8W;
Paint Creek (a.k.a. Pine Creek), east county line to confluence with unnamed creek (SE 1/4, S11, T99N, R7W, Winneshiek Co.);
Pine Creek, mouth (S10, T99N, R9W) to north county line;
Pine Creek, mouth (S26, T99N, R7W) to north line of S21, T99N, R7W;
Silver Creek, mouth to north line of S26, T100N, R9W;
Smith Creek (a.k.a. Trout River), mouth (S21, T98N, R7W) to south line of S33, T98N, R7W;
Ten Mile Creek, mouth to confluence with Walnut Creek (S18, T98N, R9W);
Trout Creek, mouth (S9, T98N, R7W) to confluence with Smith Creek (S21, T98N, R7W);
Trout Creek, mouth (S23, T98N, R8W) to confluence with unnamed tributary (a.k.a. Trout Run) in S27, T98N, R8W;

NOTE: Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative Rules Review Committee at their meeting held February [illegible], 1994.

C-20

Turkey River, south county line to west county line;
Twin Springs Creek, mouth (S17, T98N, R8W) through one half mile reach;
Unnamed Creek, mouth (SE 1/4, S11, T99N, R7W, Winneshiek Co.) to North line S12, T99N, R7W, Winneshiek Co.;
Unnamed tributary to Trout Creek (a.k.a. Trout Run), mouth to south line of S27, T98N, R8W;
Unnamed tributary to Upper Iowa River (a.k.a. Casey Springs Creek), mouth (S25, T99N, R9W) to west line of S26, T99N, R9W;
Unnamed tributary to Upper Iowa River (a.k.a. Coldwater Creek), mouth (S32, T100N, R9W) to north county line;
Upper Iowa River, east county line to west county line;
Yellow River, east county line to confluence with North Fork Yellow River (S13, T96N, R7W);
WOODBURY COUNTY
Little Sioux River, confluence with Parnell Creek (S25, T86N, R44W, Woodbury Co.) to east county line;
Maple River, south county line to east county line;
WORTH COUNTY
Deer Creek, east county line to confluence with unnamed creek (East line, S28, T100N, R19W, Worth Co.);
Elk Creek, mouth (S27, T99N, R20W, Worth Co.) to Highway 105 (S5, T99N, R22W, Worth Co.);
Shell Rock River, south county line to north county line;
Winans Creek, mouth (S36, T98N, R22W, Worth Co.) to N/S road crossing (S 1/2, S25, T98N, R22W, Worth Co.);
Winnebago River, south county line (S32, T98N, R21W, Worth Co.) to south county line (S34, T98N, R22W, Worth Co.) (entire length in county);
WRIGHT COUNTY
Boone River, south county line to confluence with Middle Branch Boone River (S2, T93N, R26W, Wright Co.);
Eagle Creek, south county line to confluence with Drainage Ditch No. 9 (S30, T91N, R25W, Wright Co.);
East Fork Iowa River, mouth (S19, T93N, R23W, Wright Co.) to north county line;
Iowa River, east county line (S13, T90N, R23W, Wright Co.) to confluence with East and West Fork Iowa Rivers (S19, T93N, R23W, Wright Co.) (entire length in county);
West Fork Iowa River, mouth (S19, T93N, R23W, Wright Co.) to north county line;
White Fox Creek, south county line to confluence with unnamed creek (E 1/2, SE 1/4, S36, T91N, R25W, Wright Co.);

567—72.51(455B) Protected stream designation procedure.

72.51(1) *Eligible petitioners.* Any state agency, governmental subdivision, association or interested person may petition the commission, according to the rules of this division, to designate a stream as a protected stream. However, if the stream had been the subject of a similar petition filed within the past two years, the commision shall not accept a petition except upon a majority vote.

72.51(2) *Content of petition.* The petition for protected stream designation shall contain the following: (a) Names, addresses, and the phone numbers of the petitioners; (b) location of the stream nominated for designation; (c) reasons why the stream is nominated, each reason being stated in a separate numbered paragraph; and (d) adequate evidence supporting the reasons for nomination. Eleven copies of the petition shall be filed with the department.

72.51(3) *Department review of petition.* Upon receipt of a petition for designation of a stream as a protected stream, the department shall make an initial determination as to whether the petition complies with 72.51(2) and whether the stream has a sufficient number of environ-

NOTE: Effective date of 2/23/94 for segments incorporated by ARC 4559A, published 1/19/94, delayed 70 days by the Administrative

mental amenities listed in 72.51(7) that further investigation is warranted. If the department finds the petition not in compliance with 72.51(7) or that further investigation is not warranted, agency proceedings to designate the nominated stream as protected shall cease and the petitioner shall be notified of the reasons for refusing to accept and act upon the petition. A petitioner aggrieved by the department's decision may appeal the decision within thirty (30) days to an executive committee of at least three commission members.

72.51(4) *Notice of initiation of protected stream designation proceedings.* Upon department acceptance of a petition nominating a stream for protected stream designation, the department shall do the following:

a. Notice of intended action. Publish a notice of intended action in the Iowa Administrative Bulletin, the content of which identifies the nominated stream and requests public input into the protected stream designation procedure.

b. Commission notification. Notify the commission at the next meeting of the filing of a petition for protected stream designation.

c. Interested agency notification. Notify regional planning commissions, county boards of supervisors, city councils, soil conservation districts through which the nominated stream runs, the fish and wildlife division of the department, the soil conservation division of the department of agriculture and land stewardship, the department of agriculture and land stewardship and the geological survey bureau of the department.

d. Countywide notification. Publish notice of the filing of the petition in a newspaper of general circulation for two consecutive weeks in each county in which the nominated stream is located.

72.51(5) *Department investigation report.* Upon department acceptance of a petition nominating a stream for protected stream designation, the department shall do the following:

a. Investigation. Supervise a field staff investigation of the stream nominated for protected stream status for the purpose of assessing the effect that extending department flood plain regulation would have on the factors listed in 72.51(7);

b. Report. File a report with the commission at a monthly commission meeting held within one (1) year after the notice of intended action was published; the report shall specifically state findings of fact or each reason alleged in the petition in support of a protected stream designation and convey a staff recommendation, including any minority recommendations and recommendations of other governmental bodies and interested persons on whether or not the stream should be regulated;

c. Interagency coordination. Invite the fish and wildlife division of the department, the geological survey bureau, and any other agency or governmental subdivision expressing an interest in the proceeding to participate in the field investigation and preparation of the report, and request their assessment of whether extension of department jurisdiction over the nominated stream would have either an adverse or beneficial impact on their agency's water resource programs.

72.51(6) *Commission determination.* After receipt of the director's report and the public has had an opportunity to submit written comments and make an oral presentation, the commission shall make a determination in writing whether or not to designate the stream identified in the petition as a protected stream, except that the commission may continue the proceeding as needed to collect or analyze additional data. The commission's determination shall be based on the factors listed in 72.51(7), as applied to the nominated stream and its flood plain and, to other relevant streams and flood plains located in the same watershed as the nominated stream, as well as any underground water system hydrologically connected to the nominated stream.

72.51(7) *Basis for protected stream designation.* Commission determination of whether or not to classify a stream as a protected stream shall be based on the balancing of the costs and benefits of possible flood plain development as it would affect the following factors: (a) Maintenance of stream fishery capacity; (b) water quality preservation; (c) wildlife habitat preservation; (d) flood control; (e) flood plain management; (f) existing flood plain developments; (g) soil erosion control; (h) the needs of agriculture and industry; (i) the maintenance and enhancement of public recreational opportunities; (j) the public's health, welfare and safety; (k) compatibility with the state water plan; (l) property and water rights of landowners; (m) other factors relevant to the control, development, protection, allocation, and utilization of the nominated stream and water hydrologically connected to it.

C-21

***567—72.52(455B) Protected stream declassification procedure.** The procedure for removing a stream from the list of protected streams in 72.50(2) of these rules shall be the same as the rules for designation of a stream as a protected stream, except that all notices, investigations and reports shall be addressed to the issue of declassification.

These rules are intended to implement Iowa Code sections 455B.261, 455B.262, 455B.263, 455B.264 and 455B.275.

[Filed 10/9/75, Notice 8/25/75—published 10/20/75, effective 11/24/75]
[Filed 5/5/78, Notice 3/8/78; Amended Notice 4/19/78—published 5/31/78, effective 7/5/78]
[Filed 9/14/78, Notice 7/12/78—published 10/4/78, effective 11/8/78]
[Filed 11/13/78, Notice 9/20/78—published 11/29/78, effective 1/3/79]
[Filed emergency 11/5/80—published 11/26/80, effective 11/5/80]
[Filed 2/23/82, Notice 12/9/81—published 3/17/82, effective 4/21/82]
[Filed 2/24/82, Notice 11/11/81—published 3/17/82, effective 4/21/82]
[Filed 4/23/82, Notice 11/11/81—published 5/12/82, effective 6/16/82*]
[Filed 4/6/83, Notice 2/16/83—published 4/27/83, effective 6/30/83]
[Filed emergency 6/3/83—published 6/22/83, effective 7/1/83]
[Filed 12/2/83, Notices 6/22/83, 7/20/83—published 12/21/83, effective 1/25/84]
[Filed emergency 11/14/86—published 12/3/86, effective 12/3/86]
[Filed 2/1/91, Notice 11/14/90—published 2/20/91, effective 3/27/91]
[Filed 12/30/93, Notice 8/18/93—published 1/19/94, effective 2/23/94*]
[Filed 7/1/94, Notice 4/13/94—published 7/20/94, effective 8/24/94]

Appendix D

Iowa Department of Natural Resources
List of Meandered Streams

MEANDERED STREAMS

Iowa Department of Natural Resources Construction Permits are required for work on or over meandered streams. A meandered stream is one which at the time of the original government survey was so surveyed as to mark, plat and compute acreage of adjacent fractional sections. The following is a list of the descriptions of the limits of these rivers in the state of Iowa.

1. Des Moines River. From Mississippi River to the junction of the east and west branches. The west branch to west line T95N, R32W, Palo Alto county, due south of Emmetsburg. The east branch to north line T95N, R29W, Kossuth County, near the north edge of Algona.

2. Iowa River. From Mississippi River to west line T81N, R11W, Iowa County, due north of Ladora.

3. Cedar River. From Iowa River to west line T89N, R13W, Black Hawk County, at the east edge of Cedar Falls.

4. Raccoon River. From Des Moines River to west line of Polk County.

5. Wapsipinicon River. From Mississippi River to west line T86N, R6W, Linn County northwest of Central City.

6. Maquoketa River. From Mississippi River to west line T84N, R3E Jackson County, due north of Maquoketa.

7. Skunk River. From Mississippi River to north line of Jefferson County, at the southwest edge of Coppock.

8. Turkey River. From Mississippi River to west line T95N, R7W, Fayette County, northwest of Clermont.

9. Nishnabotna River. From Missouri River to north line T67N, R42W, Fremont County, northeast of Hamburg.

10. Upper Iowa River. From Mississippi River to west line Section 28, T100N, R4W, Allamakee County, about two and one-half miles upstream from its mouth.

11. Little Maquoketa River. From Mississippi River to west line Section 35, T90N, R2E, Dubuque County, about one mile upstream from its mouth.

12. Mississippi River, Missouri River, Big Sioux River.

Appendix E

Miscellaneous Flood Studies

USGS Reports (see map)

CHRONOLOGICAL FLOOD-PROFILE REFERENCES

(1) Schwob, H.H., 1963, Cedar River basin floods: Iowa Highway Research Board Bulletin 27, Iowa Department of Transportation, Ames, 59 p.

(2) Schwob, H.H., and Meyers, R.E., 1965, The Mississippi River flood in Iowa: Iowa City, U.S. Geological Survey Open-File Report, 39 p.

(3) Schwob, H.H., 1966, Little Sioux River basin floods: Iowa City, U.S. Geological Survey Open-File Report, 60 p.

(4) _____1967, Floods on Otter Creek in Linn County, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 22 p.

(5) _____1968a, Floods of June 7, 1967, in the Wapsinonoc Creek basin, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 21 p.

(6) _____1968b, Flood profile study, Squaw Creek, Linn County, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 13 p.

(7) _____1970a, Floods in the upper Des Moines River basin, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 49 p.

(8) _____1970b, Flood profile study, Morgan Creek, Linn County, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 16 p.

(9) _____1970c, Flood of March 3, 1970, on Old Mans Creek, Johnson County, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 9 p.

(10) _____1970d, Flood profile study, Hoosier Creek, Linn County, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 18 p.

(11) _____1971, Floods in the Wapsipinicon River basin, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 52 p.

(12) Heinitz, A.J., 1973a, Floods in the Iowa River basin upstream from Coralville Lake, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 75 p.

(13) _____1973b, Floods of August 2, 1972, in the Little Maquoketa River basin, Dubuque County, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 28 p.

(14) _____1973c, Floods in the Rock River basin, Iowa: Iowa City, U.S. Geological Survey Open-File Report, 74 p.

(15) Lara, O.G., and Heinitz, A.J., 1976, Flood of June 27, 1975, in city of Ames, Iowa: U.S. Geological Survey Open-File Report 76-728, 56 p.

(16) Heinitz, A.J., 1977, Floods in the Big Creek basin, Linn County, Iowa: U.S. Geological Survey Open-File Report 77-209, 35 p.

(17) Heinitz, A.J., and Wiitala, S.W., 1978, Floods in the Skunk River basin, Iowa: U.S. Geological Survey Open-File Report 79-272, 80 p.

(7A) Heinitz, A.J., 1979, Supplement to floods in the upper Des Moines River basin, Iowa:, U.S. Geological Survey Open-File Report 79-1486, 6 p.

(18) _____1980, Floods in the Raccoon River basin, Iowa: U.S. Geological Survey Open-File Report 80-162, 110 p.

(19) Heinitz, A.J., and Riddle, D.E., 1981, Floods in the English River basin, Iowa: U.S. Geological Survey Open-File Report 81-67, 61 p.

(22) Heinitz, A.J., 1985, Floods in south-central Iowa: U.S. Geological Survey Open-File Report 85-100, 95 p.

(23) _____1986, Floods in the Floyd River basin, Iowa: U.S. Geological Survey Open-File Report 86-476, 61 p.

(24) Eash, D.A., and Heinitz, A.J., 1991, Floods in the Nishnabotna River basin, Iowa: U.S. Geological Survey Open-File Report 91-171, 118 p.

(25) Baebenroth, R.W., and Schaap, B.D., 1992, Floods of 1986 and 1990 in the Raccoon River basin, west-central Iowa: U.S. Geological Survey Open-File Report 92-94, 144 p.

Figure 6 U.S. Geological Survey Flood Profile Reports in Iowa.

CORPS OF ENGINEERS FLOOD PLAIN INFORMATION STUDIES

	Stream	Study Limits	District	Date of Completion
1	Indian and Dry Creeks at Cedar Rapids	Mouth of Indian Creek to Section 30, T84N, R6W, Linn County; and mouth of Dry Creek to center of Section 33, T83N, R7W, Linn County	Rock Island	December 1964
+2	Duck Creek at Davenport and Bettendorf	Mouth to 17 miles upstream	Rock Island	July 1965
3	Prairie Creek at Cedar Rapids	Mouth to county road 14.3 miles upstream at west line of Section 7, T82N, R6W, Linn County	Rock Island	February 1966
4	Skunk River and Squaw Creek at Ames	Skunk River from a point 3.3 miles downstream from confluence with Squaw Creek to gaging station 4.9 miles upstream; mouth of Squaw Creek upstream 5.3 miles to SE corner of Section 29, T84N, R24W, Story County	Rock Island	June 1966
5	Cedar River Linn County	South Linn County line upstream 43 miles to the west Linn County line	Rock Island	October 1967
+*6	Badger Creek, Odebolt Creek, and Maple River at Ida Grove	Mouth of Badger Creek upstream 2 miles; mouth of Odebolt Creek upstream 2.8 miles; and Maple River from a point 1 mile downstream from confluence with Odebolt Creek to 2.3 miles upstream	Omaha	April 1968
7	Black Hawk Creek Black Hawk County	Mouth to Black Hawk County line 14.6 miles upstream	Rock Island	December 1968
8	East Fork Hundred and Two River at Bedford	From County Road "K", river mile 7.5, to county road 1.5 miles upstream from Iowa Hwy 2, river mile 12.5	Kansas City	January 1969
9	Mississippi River	Mile 441 to Mile 512 above Ohio River, Scott and Muscatine Counties	Rock Island	June 1969
10	Des Moines River at Des Moines	From Center Street Dam in Des Moines 11 miles upstream to Saylorville Dam	Rock Island	April 1970
11	North Raccoon River at Sac City	From county road in SW 1/4, Section 36, T88N, R36W, Sac County, upstream 8.97 miles to county road in NW 1/2, Section 11, T88N, R36W, Sac County	Rock Island	June 1970
12	Cedar River, Evansdale, Waterloo, and Cedar Falls	From a point 2.5 miles downstream of Waterloo Railroad in Evansdale to a point 5.9 miles upstream of U.S. Hwy. 218 in Cedar Falls	Rock Island	June 1970
+*13	Crow Creek at Bettendorf	Mouth to 0.8 mile upstream of Interstate 80	Rock Island	May 1971
14	Little Sioux River, Ocheyedan River, and Muddy Creek at Spencer	Little Sioux River from a point 5.5 miles downstream of U.S. Hwys. 18 and 71 to 12.5 miles upstream, mouth of Ocheyedan River upstream 5 miles, and mouth of Muddy Creek upstream 3 miles	Omaha	June 1971
15	Wapsinonoc Creek at West Liberty	From county road on south line of Section 24, T78N, R4W, to the Muscatine-Cedar County line, including the West, Middle, and East Branches	Rock Island	June 1971
16	Wapsipinicon River and Malone Creek at Independence	From county road at SE corner of Section 30, Liberty Township, upstream to the north line of Section 30, Washington Township, and from mouth of Malone Creek to county road on north line of Section 24, Washington Township	Rock Island	June 1972
*17	Mad Creek at Muscatine	From Clay Street to Iowa Hwy. 38	Rock Island	December 1972
18	Mississippi River	Mile 506.9 to mile 549.4 above Ohio River, Clinton and Jackson Counties	Rock Island	June 1973
19	Winnebago River and tributaries at Forest City	Winnebago River starting at County Road "A", 7 miles downstream the Hancock-Winnebago County line to a point 14.9 miles upstream; Silver Creek lower 1.1 miles, Beer Creek lower 1.3 miles, and Twister Creek lower 2.2 miles, Hancock and Winnebago Counties	Rock Island	June 1973
20	North Fork Maquoketa River and tributaries at Dyersville	Maquoketa River from a point 5 miles downstream of U.S. Hwy. 20 in Dyersville to a point 10.8 miles upstream, lower 4.5 miles of Bear Creek; lower 3.4 miles of Hewitt Creek; and lower 1.7 miles of unnamed creek tributary of Hewitt Creek	Rock Island	June 1973
21	Perry Creek at Sioux City	Mouth to a point 7 miles upstream	Omaha	October 1973
22	Winnebago River at Mason City	From a point 2.8 miles downstream of USGS gage and U.S. Hwy. 18 in Mason City upstream to U.S. Hwy. 65 north of Mason City	Rock Island	June 1974
23	Willow Creek and tributaries at Mason City	Mouth of Willow Creek to a point 13.4 miles upstream; mouth of Cheslea Creek to South Taft Avenue, 3.19 miles upstream; and lower 2.25 miles of Crane Creek	Rock Island	June 1974
24	Mississippi River	Mile 549.4 to mile 608.5 above Ohio River, Clayton, Dubuque, and Jackson Counties	Rock Island	October 1974
25	Mississippi River	Mile 361 to mile 442 above Ohio River, Lee, Des Moines, and Louisa Counties	Rock Island	October 1974
26	Skunk River north of Ames	From gaging station north of Ames in Section 23, T84N, R24W, Story County, to the Story-Hamilton County line	Rock Island	June 1975
27	Nodaway River and North Branch at Clarinda	Nodaway River from a point 2 miles downstream of U.S. Hwy. 71, river mile 459.5, to first county road above Washington Street, river mile 465.7; and mouth of North Branch to 16th Street	Kansas City	November 1975

*Special Flood Hazard Investigation Report
All reports were sponsored by the Iowa Natural Resources Council and all reports are complete.

+Out of print

Appendix F

Form 1-E

Risk Assessment Form

COMPLETING THE FORM 1-E

A sample Form 1-E follows these instructions. The Form 1-E is required only for structures with a total length of 20 feet or greater.

Line #1
Mark the location within the section with an X in the square box.

Line #3---Project Number
The Office of Local Systems will assign project numbers to structures to be let in Ames with Farm-to-Market or Federal Funds. If the project will be let locally, it is important for you to assign a project number (up to seven digits) because we need it for internal accounting purposes.

The Office of Bridges & Structures will assign a file number to the project when it is received for the first preliminary review. This office will assign design numbers to projects that will be let or reviewed in Ames. Design numbers will be assigned only after two copies of the plans are sent in for the first structural design review.

Line #5---Extreme high water
This is an actual known elevation, not a calculated elevation such as in Line #29 for "Design high water". Accurate information here is very important. On existing bridges, the downstream high water marks are more usable than high water marks on a pier or upstream from the bridge. Pier high water marks are effected by draw down. Upstream high water marks are effected by backwater caused by the present bridge. However, all are helpful in designing a new bridge.

A copy of the INRC's "Instructions for Setting High Water Marks" is attached as Appendix H for your information and use. This is an old instruction but the method is valid today. If possible, you should have a high water mark at or near the typical valley section you use for designing your bridge opening. This information allows us to determine how the present structure performed during extreme floods and helps determine the bridge opening that will be needed.

Line #6---Ordinary high water
"Ordinary high water" on Form 1-E really means a typical high water that happens every year or two and no more often than every five years. Do not use long interval flood data here, such as a 50-year flood. Also, Line #6 should not be confused with the "Ordinary High Water" that is calculated for 404 Permits as discussed in Appendix A. These are completely different uses of the same term, so do not confuse them.

Line #7---Average low water
Stream slope is more accurately determined using low water shots than using stream bed shots. Stream bed shots may contain blow holes and humps that can considerably distort the value. These holes and humps can be so gradual that they are not apparent until the survey information is plotted.

Give the plan data if the stream is a Drainage District and the last clean-out plans are available.

Line #8---Buildings in the floodplain

This information is important especially if design high water elevation will be increased due to raising the road grade or reducing the hydraulic opening of the structure.

Line #12 and #13---Ice and debris

Potential for ice or debris in the stream may result in stronger piers than would otherwise be needed. In general, P-10 pile bent piers may be used in most of the bridges below 100 square mile drainage area. If ice and debris is a problem, stronger piers may be needed on even a much smaller drainage area. Bridges draining more than 100 square miles will generally need a stronger pier than the P-10 type. That could be a fully-encased P-10 pier or a river tee pier.

Line #29 and #30---Design high water & roadgrade overflow

Do not confuse design high water and extreme high water. Design high water is determined by taking a calculated flood discharge such as a Q_{25} and then using PCVAL or WSPRO to develop the water surface elevation. Extreme high water is an actual high water elevation obtained from sources such as maintenance records or residents who have lived near the bridge site for many years.

Less important roads can be designed to pass a smaller and more frequent flood by allowing roadgrade overflow. Where the structure is over a large stream or over a stream where drift or ice could be a problem, adequate clearance for the bridge should be provided even though the approaches are over topped by a relatively small flood. Bridges over these large streams should have clearance above the 50-year flood and, in most cases, should be above the extreme high water. Overflow bridges can be set with the low superstructure one foot above the design high water.

Roadgrade overflow as a design means of allowing shorter bridges becomes more attractive as road funds dwindle. The practicality of road grade overflow is an option that the Engineer must evaluate. If road grade overflow is used, the plans should be so noted. This will help guard against a future grade raise without reanalyzing the hydraulics of the crossing.

See section "Design Guidelines" in IM 3.131 for detailed discussion of the selection of design floods and clearances.

Line #32---Wing dikes

Use wing dikes on all bridges with significant overbank flows. It is much better to have the end of a wing dike erode away than have the bridge berm damaged. See Appendix I for wing dike details.

Line #34---Traffic count

Since the county or city will have the most recent and accurate traffic information, please fill this out.

Back of Form 1-E

Completing the "Valley Cross Section Data" on the back side of this form is very important and should be completed as accurately as possible. Always list the location of the valley section under the "Remarks" section on the back side. Read the instructions on taking a valley section. This information can also be furnished on the printout from hydraulic software such as PCVAL, WSPRO, HEC-2, HYCLV, etc.

Form 621003
5-91
(Form 1-E)

Iowa Department of Transportation

REQUEST FOR APPROVAL: LOCAL ROAD SYSTEM

LOCATION

1. County/City Appanoose Sec. 27 [X] Twp. 69N Range 28W
2. Over (River, Cr., Dr., Ditch) Little Creek Civil Twp. Johns
3. Road System: Farm to Market / Local Co. / City — Proj. No. L-92761--73-04 Sta. Pres. Struct. 103+80 Sta. Prop. Struct. 103+92.5 FHWA No. 042260

GENERAL DATA (FIELD)

4. Drainage area 23 Sq. Mi. Character Hilly Approx. length and width 4 mi. X 7 mi.
5. Extreme highwater: Date of occurrence June 1947 Information from John Doe (landowner)
(Elev. near site 994.0 Location 300' upstream) (Elev. upstream 996.4 Location 1/2 mile) (Elev. downstream 992.0 Location 2000')
6. Ordinary highwater. Elev. 990.0 Occurs every 2 Years. Date of last occurrence 1992
7. Average low water: (Elev at site 980.5 Average streambed 980.0 (Water elev. 980.5 on date of survey 7/21/93)
(Water elev. 981.7 upstream 1320 ft.) (Water elev. 979.4 downstream 1250 ft.) Fall in stream 4.75 ft./mi.
8. List buildings in flood plain Corn Crib Location 300' upstream Floor Elev. 996.5
9. Is excessive local scour probable? No Probable max. depth of scour below streambed --- ft.
10. Is stream deepening or filling? Neither Approx. amount per year ---
11. Is stream widening? No (Show direction, rate and amount)
12. Does stream carry appreciable amount of ice? No Elev. of high ice ---
13. Does stream carry appreciable amount of large driftwood? No
14. Bench Mark No 10 spike in 32" Ø Boxelder Sta 103+25 St. 60' elev. 1001.37

PRESENT OR OLD STRUCTURE (FIELD)

15. Superstructure Type 80' X 20' Pony Truss w/approaches Skew angle 0
16. Substructure. Type Wood abutments, concrete piers
17. Span lengths 15' - 50' - 15' Roadway width 20' Type of floor Conc.
18. Grade elev. 996 Date built 1919 DOT Design No. N/A DOT File No. N/A
19. Condition of superstructure Poor
20. Condition of substructure Fair
21. Remarks Contractor to remove and dispose

PROPOSED STRUCTURE (OFFICE)

List fill if RCB or Pipe ____ ft
Length of RCB or Pipe ____ ft
Flow Line Left ____
Flow Line Right ____

22. Superstructure. Type Continuous Concrete slab Skew Angle 0 RA LA
23. Substructure: Type P10 Piers, Integral Abuements
24. Span lengths 34'-3;44'-0;34'3 Total bridge length 112'-6 ft.
25. Bridge rdwy. width 30' ft. Approach rdwy.: Width sh to sh 30' ft. Type of surfacing PC Pave.
26. Type of railing conc. Type of floor conc. Type of curb conc. Class of loading HS20
27. Grade elev. 997.4 Abut. footing elev. 991.2-99 River footing elev. 976 Request soundings by DOT? No
28. Length and type of piling: Abuts. design after soundings Piers. same
29. Design highwater: Elev. 992.6 Discharge Q = 4200 cfs; Bridge Waterway Area 838 Sq. ft.; Frequency 50 Yrs.
30. What provision is made for overflow? None
31. Can channel be cleared to provide more waterway? No
32. Are wing dikes to be provided? Yes (Appendix I)
33. Disposition of existing structure Remove
34. Traffic count By Iowa D.O.T. VPD 275 Year of Count 1985
35. Remarks:

Notes for Approval Checked ____
County/City Appanoose
Project No. L-92761--73-04
IA DOT Design No. ____
File No. 5897)

Notes and Recommendations By (Signed) City/County Engineer (Dated) Date

Approved By ____ District Engineer ____ Date

F-5

(Over)

VALLEY CROSS SECTION DATA

The submittal of a bridge type structure will include a right angle valley section. This section should be taken downstream from the crossing. It shall be noted whether it is an average section or a control section. Enough ground shots will be taken to outline the valley to an elevation well above extreme highwater. Special care will be taken to accurately outline the main channel including several streambed shots. Each shot should be identified; that is (FP) flood plain, (TB) top of bank, (ES) edge of stream, etc. Mannings equation roughness factors will be assigned each shot. Include site photos with this information.

REMARKS: Section taken 100' downstream from crossing. It is an average section. There is no control section downstream from the bridge that effect the bridge hydraulics.

Shot No.	Distance	Elevation	(N) Roughness	Remarks
1	0	997.0	n=0.07	FP
2	92	995.0		
3	145	993.0		
4	275	991.0		
5	430	990.0	n=0.07 n=0.03	TB
6	462	982.5		ES
7	472	979.5		℄
8	487	982.5		ES
9	510	990.0	n=0.03 n=0.07	TB
10	562	990.0		FP
11	705	993.0		FP
12	745	995.0		FP
13				
14				
15				

Shot No.	Distance	Elevation	(N) Roughness	Remarks
16	807	1000.9	0.07	FP
17	900	1003.0	0.07	FP
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

PLAT OF DRAINAGE AREA

The drainage area is to be platted as completely and accurately as possible and to the largest practicable scale on a separate sheet. Use a definite scale, as 1" equals ¼, ½, 1 or 2 miles, and indicate what scale has been used. In addition to the outlines of the watershed, indicate the positions of the streams and, roughly, the character of the soil and the relative locations of the steep and flat portions. For most watersheds the information may be secured from the best existing data, soil maps, U.S.G.S. maps and Bulletin No. 7-1.H.R.B. No plat is necessary if the area is listed in Bulletin Number 7.

REMARKS: _____

Give additional information by reference to marginal number on reverse side of this sheet.

Marginal No.	
5	Mr. Doe has been living in this area all his life (62 years).

IMPORTANT NOTE

The information given on this form must in all cases be supplemented by complete plan and profile of the site, drawn to a convenient scale on a separate sheet.

The information as shown on this form is essential and must be supplied in detail before the plans can be approved. It may be necessary to return this form for correction unless the data supplied is complete.

GUIDE FOR COMPLETING
IOWA DEPARTMENT OF TRANSPORTATION
RISK ASSESSMENT FORM FOR BRIDGES (CULVERTS)

I. HYDROLOGIC EVALUATION

A. Check the USGS Water Surface Records
B. Check Flood insurance studies
Check USGS Reports
Check Corps of Engineer Projects
C. Select Q10, Q25, Q50 etc. from Frequency Curve
Estimate Backwater for each. (Method used is Optional)
The backwater estimates should be based on the recommended structure.
Method used to compute discharge will ordinarily be USGS Report 87-4132 or Gaging Station Data if there is a gaging station at or near the site. For smaller watersheds it could be site experience.
D. See attachments

II. PROPERTY RELATED EVALUATION

A. Low Damage Potential - No Buildings
Moderate Damage Potential - Outbuildings
High Damage Potential - Residence/Industrial
B. These would nearly always be Flood Insurance Studies, all the information should be in the study
See current list of studies in office files
For additional information call Department of Natural Resources (Flood Plain Permits Section)

III. ENVIRONMENTAL CONSIDERATIONS

A. Check the Concept Statement
Check with Project Planning if necessary

IV. HIGHWAY AND BRIDGE (CULVERT) RELATED EVALUATION

A. Check appropriate features, if any.
B. Identify flood frequency at overtopping if less than Q500
Length of overtopping _____ ft at Q50 - this could be expanded in comment.
Embankment - identify as erosion prone or not. - slope cover is usually established turf.

V. MISCELLANEOUS COMMENTS

A-E. Self Explanatory
F. Comments - Typical Comments
Bed of stream is fine sand, extra pile length required.
Bank stabilization may be required in the future -not recommended at this time.
Rip-rap on spur dikes not recommended.

VI. TRAFFIC RELATED EVALUATIONS

A. Self Explanatory
B. Self Explanatory
C. Self Explanatory
D. Detour - is the road (structure) washed out where would the traffic go?

VII. PRESENT FACILITY

A. Self Explanatory
B. Waterway opening below low point in the gradeline X Velocity through the opening = Q
At what flood frequency does the road overtop?
Self Explanatory - Most streams draining less than 500 sq. miles plus or minus are subject to flash flooding

VIII. ALTERNATES

A. Self Explanatory
B. Self Explanatory
Discussion - If other alternatives were considered e.g. longer bridge or shorter bridge or culvert - state in a general way and give reason for rejection.

Example: - A culvert was considered but was rejected because of drift potential.

or

A longer bridge was considered but was considered too costly.

or

The recommended structure is considered to be the minimum acceptable structure for this site. A larger structure is also acceptable but due to higher costs is considered to be less desirable.

C. For most sites further analysis would not be necessary.

IOWA DEPARTMENT OF TRANSPORTATION
RISK ASSESSMENT FOR BRIDGES(CULVERTS)
(For 20' Span and Longer Structures)

Example Risk Assessment

LOCATION

County Bremer Civil Twp. Jackson Sec. 35 Twp. 91N Range 14W
Over (River, Cr., Dr. Ditch) Cedar River Road No. U.S. 218
Project No. F-218-8(20)--20-09 Design Number 189 FHWA No. ---
Assessment Prepared by B. Barrett Date 8/1/88

1. HYDROLOGIC EVALUATION

A. Nearest Gaging Station on this stream _____ (None____) _____
At Janesville, 2000' downstream
B. Are flood studies available on this stream: _____
C. Flood Data:
Q_{10} 20,000 cfs Est. Bkwtr. 0 ft. Q_{25} 27,000 cfs Est. Bkwtr. 0 ft.
Q_{50} 36,200 cfs Est. Bkwtr. 0.1 ft. Q_{100} 41,000 cfs Est. Bkwtr. 0.1 ft.
Q_{500} 49,000 cfs or Overtopping _____ cfs (Whichever is lower)
Drainage Area 1661 mi^2 Method Used to compute Q gage records
D. Does the crossing require outside agency approval? Yes X No _____
List Agencies: DNR, Corps

2. PROPERTY RELATED EVALUATIONS

A. Damage potential: Low X Moderate _____ High _____
List buildings in flood plain None Location _____
Floor Elevation _____
Upstream Land Use Timber
Anticipate any Change? No
B. Any flood zoning? (FIA Studies, etc.) Yes X No _____
Type of Study Janesville Flood Insurance Study
Base flood elevation 888.2' (100 year)
Regulatory floodway width 700' (As noted in FIA Studies)
Comments: _____

3. ENVIRONMENTAL CONSIDERATIONS

A. List commitments in Environmental Documents which affect Hydraulic Design (None X)

4. HIGHWAY AND BRIDGE(CULVERT) RELATED EVALUATIONS

A. Note any outside features which might affect Stage, Discharge or Frequency.
Levees X Aggradation/Degradation ___ Reservoirs ___ Diversions ___
Drainage Dist. _____ Navigation ___ Backwater from another source _____
Other _____
Explanation: Levee on east bank downstream of proposed bridge.
B. Roadway Overflow Section. (None X) Length _____ Elev. _____
Embankment: Soil Type _____ Type Slope Cover _____
Comments: _____

5. MISCELLANEOUS COMMENTS

A. Is there unusual scour potential? Yes ___ No X Protection Needed? No
B. Are banks stable? Yes Protection Needed? No
C. Are spur dikes needed? Yes X No ___
D. Does stream carry appreciable amount of ice? Yes Elev. of high ice Unknown
E. Does stream carry appreciable amount of large driftwood? Yes
F. Comments: ___

6. TRAFFIC RELATED EVALUATIONS

A. Present Year 1992 Traffic Count 7100 VPD % Trucks 8%
B. Design Year 2012 Traffic Count 8650 VPD % Trucks 8%
C. Emergency Route Yes School Bus Route Yes Mail Route Yes
D. Detour Available? Yes Length of Detour 6 Miles
Comments: ___

7. PRESENT FACILITY

A. Low Roadway Elevation: NA (present roadway is 0.8 miles downstream)
B. Bridge Hydraulic Capacity at point of overtopping ___ cfs
___ Frequency (if Less than Q_{500})
C. Is flash flooding likely? Yes ___ No X
Comments: ___

8. ALTERNATIVES

A. Recommended Design Dual 673'-10 X 40' PC Beam Bridges
Low Superstructure (Bridge) 896.0 Top Opening(culvert) ___
Low Roadway Grade 893.1
Bridge Waterway Opening 8000 ft² Culvert Opening ___
B. Were other hydraulic alternates considered? Yes X No ___
Discussion: The recommended design is considered to be the minimum acceptable structure at this site.
C. Is this assessment commensurate with the risks identified (Yes X No ___)
or is further analysis needed? (Yes ___ No X)

Appendix G

Soils Information

The following information and recommendations are from the Soils Section of IDOT's Office of Design.

A Registered Engineer must certify that the bridge berms have been reviewed for long-term stability and provide a minimum factor of safety against sliding of at least 1.25.

At least one boring per structure must be tested by using standard penetration methods so that the 1989 Foundation Soils Information Chart (attached) may be used to check foundation type and design.

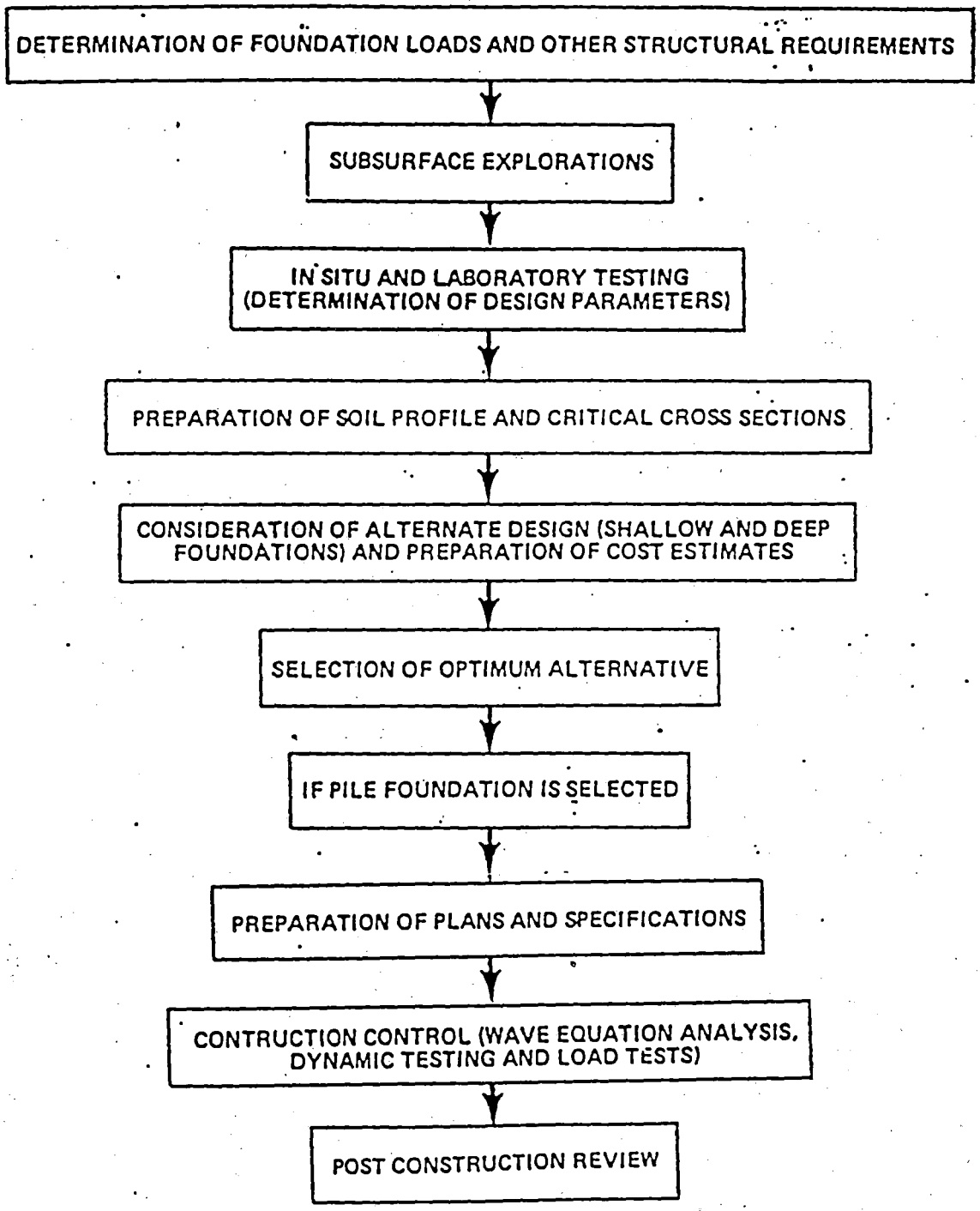
Also included in this appendix is a Sample Boring Information sheet. Contact the Soils Section for information pertaining to the Wave Equation.

Factors to consider when selecting pile type

1. Displacement piles may not be drivable in materials having N-values in excess of 25.
2. Displacement piles may not be drivable if identifiable boulder layers are present.
3. Displacement piles may not be drivable through "dry" sands.
4. Steel H piles with driving shoes may be required if sloping bed rock surfaces are to be penetrated.
5. Steel H piles with driving shoes may be required if significant layers of N > 100 are to be penetrated.

Selecting a foundation layer

1. End all piles in a non-compressible layer.
2. Be sure the required design bearing is obtained below the potential erosion/scour depth.
3. Piles must be well seated in the foundation layer.
4. Minimum pile length in contact with the ground is ten feet.


DETERMINATION OF FOUNDATION LOADS AND OTHER STRUCTURAL REQUIREMENTS
SUBSURFACE EXPLORATIONS
IN SITU AND LABORATORY TESTING (DETERMINATION OF DESIGN PARAMETERS)
PREPARATION OF SOIL PROFILE AND CRITICAL CROSS SECTIONS
CONSIDERATION OF ALTERNATE DESIGN (SHALLOW AND DEEP FOUNDATIONS) AND PREPARATION OF COST ESTIMATES
SELECTION OF OPTIMUM ALTERNATIVE
IF PILE FOUNDATION IS SELECTED
PREPARATION OF PLANS AND SPECIFICATIONS
CONTRUCTION CONTROL (WAVE EQUATION ANALYSIS, DYNAMIC TESTING AND LOAD TESTS)
POST CONSTRUCTION REVIEW

FOUNDATION SOILS INFORMATION CHART

SOIL DESCRIPTION	MEAN N-VALUE	MEAN OF N-VALUE	ESTIMATED ALLOWABLE BEARING VALUES-FOR FRICTION PILE IN TONS PER FT. FACTOR OF SAFETY = 2.0									
			WOOD PILE	STEEL "H" 10	STEEL "H" 12	STEEL "H" 14	CONCRETE 16	CONCRETE 12 | 14	STEEL SHELL PILE 18	STEEL SHELL PILE 14	STEEL SHELL PILE 12	STEEL SHELL PILE 10
ALLUVIUM OR LOESS												
VERY SOFT SILTY CLAY	1	0-1	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
SOFT SILTY CLAY	3	2-4	0.3	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2
STIFF SILTY CLAY	6	4-8	0.4	0.3	0.4	0.5	0.5	0.4	0.5	0.4	0.3	0.3
FIRM SILTY CLAY	11	7-15	0.6	0.5	0.6	0.7	0.8	0.7	0.7	0.6	0.5	0.4
STIFF SILT	6	3-7	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
STIFF SANDY SILT	6	4-8	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
STIFF SANDY CLAY	6	4-8	0.4	0.3	0.4	0.5	0.6	0.5	0.5	0.4	0.4	0.3
SILTY SAND	8	3-13	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.2	0.2
CLAYEY SAND	13	6-20	0.5	0.4	0.5	0.7	0.7	0.6	0.7	0.6	0.5	0.4
FINE SAND	15	8-22	0.6	0.5	0.6	0.7	0.8	0.7	0.7	0.6	0.5	0.4
COARSE SAND	20	12-28	0.8	0.7	0.8	0.9	1.0	0.9	0.9	0.7	0.6	0.5
GRAVELLY SAND	21	11-31	0.8	0.7	0.8	0.9	1.0	0.9	0.9	0.7	0.6	0.5
GRANULAR MATERIAL	>40		1.0	1.0	1.2	1.4			1.4	1.1	1.0	0.8
GLACIAL CLAY												
FIRM SILTY GLACIAL CLAY	11	7-15	0.7	0.6	0.7	0.8	0.9	0.8	0.8	0.6	0.6	0.5
FIRM CLAY(GUMBOTIL)	12	9-15	0.7	0.6	0.7	0.8	0.9	0.8	0.8	0.6	0.6	0.5
FIRM GLACIAL CLAY	11	7-15	0.6 (0.8)	0.7 (0.8)	0.8 (1.0)	0.9 (1.1)	1.0 (1.2)	0.9 (1.1)	0.9 (1.1)	0.7 (0.8)	0.6 (0.7)	0.5 (0.6)
FIRM SANDY GLACIAL CLAY	13	9-15	0.6 (0.8)	0.7 (0.8)	0.8 (1.0)	0.9 (1.1)	1.0 (1.2)	0.9 (1.1)	0.9 (1.1)	0.7 (0.8)	0.6 (0.7)	0.5 (0.6)
FIRM-VERY FIRM GL. CLAY	14	11-17	0.7 (0.9)	0.7 (1.0)	0.8 (1.2)	0.9 (1.4)	1.2 (1.4)	1.1 (1.3)	1.0 (1.3)	0.8 (1.0)	0.7 (0.9)	0.6 (0.8)
VERY FIRM GLACIAL CLAY	24	17-30	0.7 (0.9)	0.7 (1.0)	0.8 (1.2)	0.9 (1.4)	1.1 (1.6)	0.9 (1.4)	1.0 (1.3)	0.8 (1.0)	0.7 (0.9)	0.6 (0.8)
VERY FIRM SANDY GLACIAL CLAY	25	15-30	0.8 (1.0)	0.7 (1.0)	0.8 (1.2)	0.9 (1.4)	1.1 (1.6)	0.9 (1.4)	1.0 (1.3)	0.8 (1.0)	0.7 (0.9)	0.6 (0.8)
COHESIVE OR GLACIAL MATERIAL	>35		0.8 (1.0)	0.7 (1.0)	0.8 (1.2)	0.9 (1.4)	1.1 (1.6)	0.9 (1.4)	0.9 (1.4)	0.7 (1.1)	0.6 (1.0)	0.5 (0.8)

FO[illegible]BLE ENTRIES :
UP[illegible] VALUES ARE DESIGNATED FOR EMBEDDED PILE WITHIN [illegible] FROM THE NATURAL GROUND
LO[illegible] VALUES ARE FOR PILE DEPTH GREATER THAN 30 FEET [illegible] THE NATURAL GROUND

TABLE 2

FOUNDATION [illegible]S INFORMATION CHART

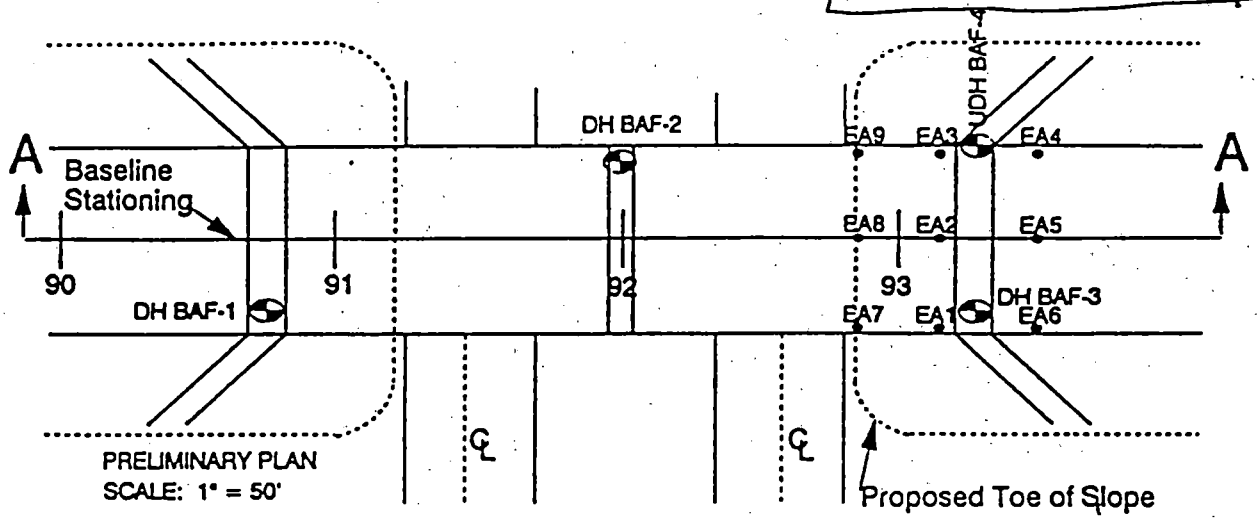
SOIL DESCRIPTION	MEAN N-VALUE	RANGE OF N-VALUE	ESTIMATED ALLOWABLE END BEARING VALUES (TONS) FACTOR OF SAFETY = 2.0										REMARK
			WOOD PILE	STEEL H 10	STEEL H 12	STEEL H 14	CONCRETE 16	CONCRETE 14	STEEL SHELL PILE 18	STEEL SHELL PILE 14	STEEL SHELL PILE 12	STEEL SHELL PILE 10	
GRANULAR MATERIAL			DO NOT CONSIDER END BEARING FOR N LESS THAN 10										
MED SAND	15		8	-	-	-	27	21	27	16	12	8	
FIND SAND	15		8	-	-	-	27	21	27	16	12	8	
COARSE SAND	20		11	-	-	-	37	29	36	22	16	11	
GRAVELLY SAND	21		11	-	-	-	37	29	36	22	16	11	
	25		14	-	-	-	-	-					
	25-50		-	1000-2000 PSI									
	50-100		-	2000-4000 PSI									
	100-300		-	4000-8000 PSI					1.4× N IN TONS				
	>300		-	9000 PSI					PER SQUARE FT				
BEDROCK	100-200		-	6000 PSI									PILE END AREA Sq.
	>200		-	9000 PSI									10X42 12.4 16X57 16.8 12X53 15.5 12X74 21.8 14X73 21.4
COHESIVE MATERIAL													
	12	10-15	4				13	10	13	8	6	4	26.1 ← 14x89
	20		6	500 PSI			21	16	21	13	9	7	
	25		8	1000 PSI			27	21	27	16	12	8	
	50		20	2000 PSI			53	41	53	32	24	14	
	100			3500 PSI			0.7×N IN TONS PER SQUARE FT						

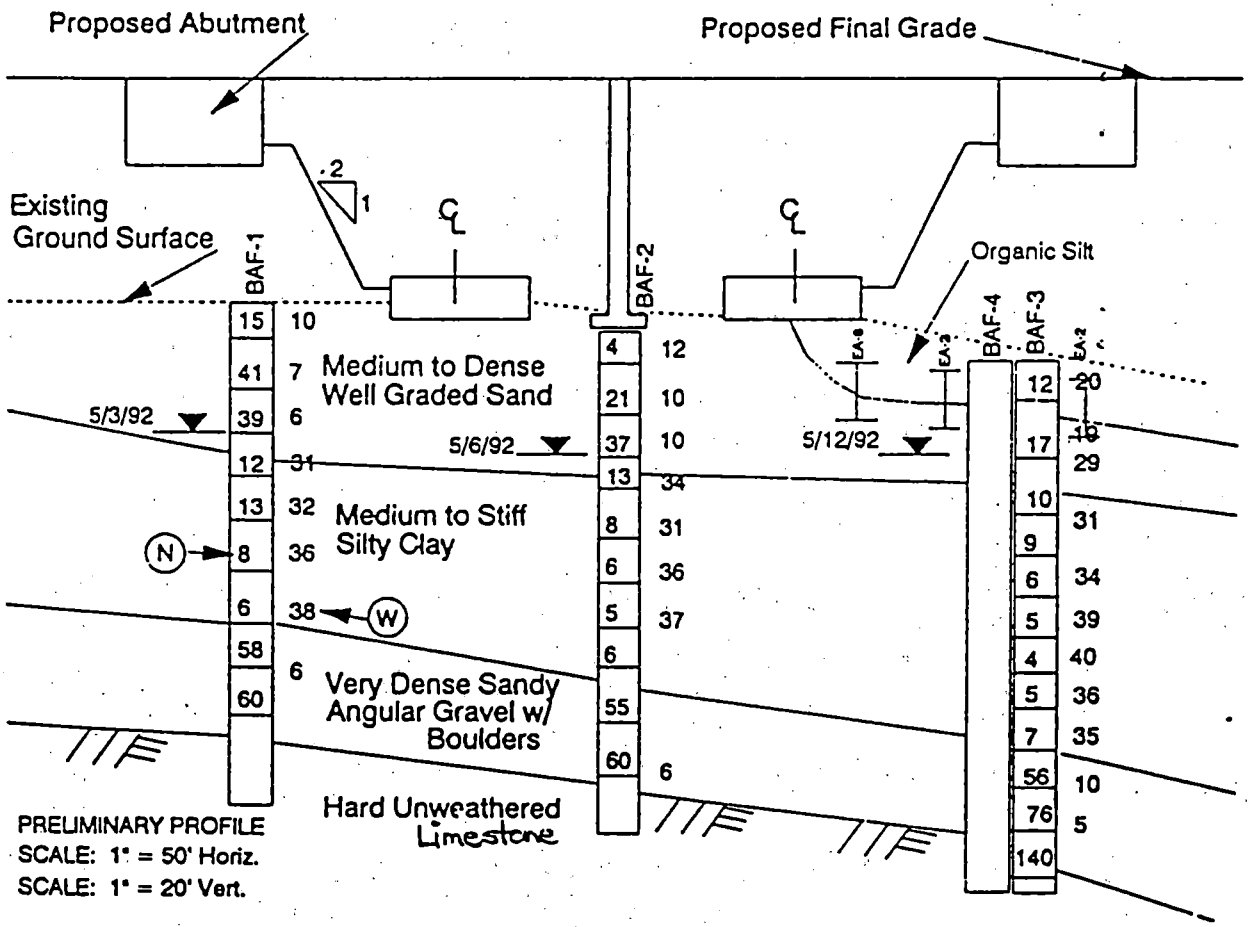
NOTE: END BEARING FOR WOOD PILE IS BASED ON THE END AREA= 0.5 SQ FT
BEARING SHALL BE ADJUSTED ACCORDINGLY FOR DIFFERENT TIP DIMENSION

TABLE 1

4-5

Sample Boring Information





Appendix H

Instructions For Setting High Water Marks

Iowa Natural Resources Council 1969

High water marks, when carefully set and the elevation subsequently established, serve many useful purposes in preparing plans for projects that may be affected by flood flows. These notes on the setting of high water marks are intended to guide the reader in setting marks. Information obtainable from highwater marks can be useless if the marks are not carefully set and documented. The Iowa Natural Resources Council may be contacted for information of marks set or assistance in setting new high water marks.

It is desirable to establish high water marks for all floods large enough to cause flooding the bottomlands even if the flood is lower than others that have been recorded. Marks of several floods at the same location are very useful for hydrologic and hydraulic calculation.

Installation of Mark:

INRC Aluminum Discs

Fasten with a scaffolding nail to buildings, trees, fence posts, or other convenient objects, preferably between 2 and 6 feet above ground and out of plain sight whenever possible, to protect them from malicious damage. The top of the nail should be as near as possible to the high water line. The date of the flood crest, if known, may be stamped on the disc with a die set or marked on the disc with a sharp object (month-day-year as 6/22/61).

A photograph of the area showing the location of the disc is helpful if it is located in a remote area.

Painted Lines

On concrete, steel, or rock ledges, where a disc cannot be fastened, a stripe of paint may be used. The lower edge of the painted line should be as near as possible to the high water line.

Location of Flood Marks:

High water marks can usually be set more accurately and more conveniently after the flood crest has passed.

Structures on the floodway or lodging of debris often cause considerable variation of flood heights and care should be exercised to see that the mark truly represents the normal flow condition. Marks influenced by waves, wakes from boats, etc. should be avoided in setting high water marks. A relatively straight portion of the stream is always more desirable then a tortuous section.

Flood waters often leave a line on tree, posts, or other objects. These are often visible for sometime after the flood and may be used for setting flood markers.

Material left in fields or along roadsides often permit a determination of the high water. This level can often be transferred to a convenient marking place by user of a hand level. If this is done, the location of the original mark should be recorded also.

Local residents often observe the depth of water on roads or the extreme edge of the high water. Information of this type can also be transferred to a convenient marking place by use of a hand level. This type of mark should be identified in the notes as being set by a local resident.

Photographs of unusual flood conditions should also be obtained.

Number of Flood Marks:

IT IS ALWAYS BETTER TO HAVE TOO MANY MARKS RATHER THAN TOO FEW. Usually one good flood mark per mile of stream (except at bridge sites) will give adequate information for most planning purposes in rural areas. An attempt should be made to keep all highwater marks on one side of the flood plain in rural areas. In special study areas, additional marks should be established for comparative purposes.

In urban area, high water marks should be set as close as possible along both banks of the stream. Intervals of one city block between marks would be a reasonable distance to maintain.

Around bridges it is desirable to set numerous high water marks to facilitate future indirect measurements of discharge and an accurate determination of backwater amounts. The following diagram will aid in the placement of marks at bridge sites.

Photographs of the downstream contraction and the upstream entrance conditions should be obtained if they appear to be unusual.

Several marks should also be set near dams, fills, etc.

Record of High Water Marks:

The record sheets furnished with the flood marks should be filled out at the time the marker

is installed. All items should be completed as follows:

Line 1 - Self explanatory.

Line 2 - Self explanatory, give time of crest if know.

Line 3 - Note side of section as well as number such as N. side Section 12. Township name may be used instead of township and range. If section and township are not known, clearly describe location such as County Road C28, 2 miles south of State Highway No. 218.

Line 4 - Description. Give details such as: aluminum disc 3.6' above ground on south side of 16' elm tree. 150' east of bridge and 75' south of centerline of road, or red painted stripe at northeast corner of bridge on wingwall 2.0' above ground. It is very important that all details regarding the location be given.

Line 5 - Self explanatory.

Line 6 - Source of information. How you know the water reached this height. Such as: visible water line on tree; or debris lodged along road; or John Jones, farmer living 1½ miles east saw water this deep on road.

Line 7 - Elevation. The elevation does not need to be established at the time the flood mark is set. If a survey crew is working in that locality they may find it convenient to establish the mean sea level elevation. If not, it is planned that these elevations can be determined at the time such information is needed. A central file of mark descriptions will be maintained by the Iowa Natural Resources Council for the use of all interested parties.

Line 8 - Remarks. Other information concerning other floods or peculiarities of this flood is often useful and should be noted on the record sheet.

Application of the above instructions are shown on the following page.

HIGH WATER MARK

River: Des Moines

Date and time of flood: June 26, 1947 Date set: June 28, 1947

Location Polk E Side 36 78N 23W
County **Section** **Township** **Range**

Description: Aluminum disc, 1.8' above ground on 9" hedge corner post of SE corner of field, 300' from north river bank on west side of road.

Set by R. Doe

Source of Information: John Doe, farmer living first house north of w. side of road saw water this deep across road during flood, also flood line on post.
Elevation 1128.5 **By** S. Smith

Date August 4, 1960

Remarks: Mr. Doe said water was about 6" lower on June 15 and 15" lower on June 6, 1947.

HIGH WATER MARK

River: _____

Date and time of flood: _____ Date set: _____

Location _____ _____ _____ _____
County **Section** **Township** **Range**

Description:

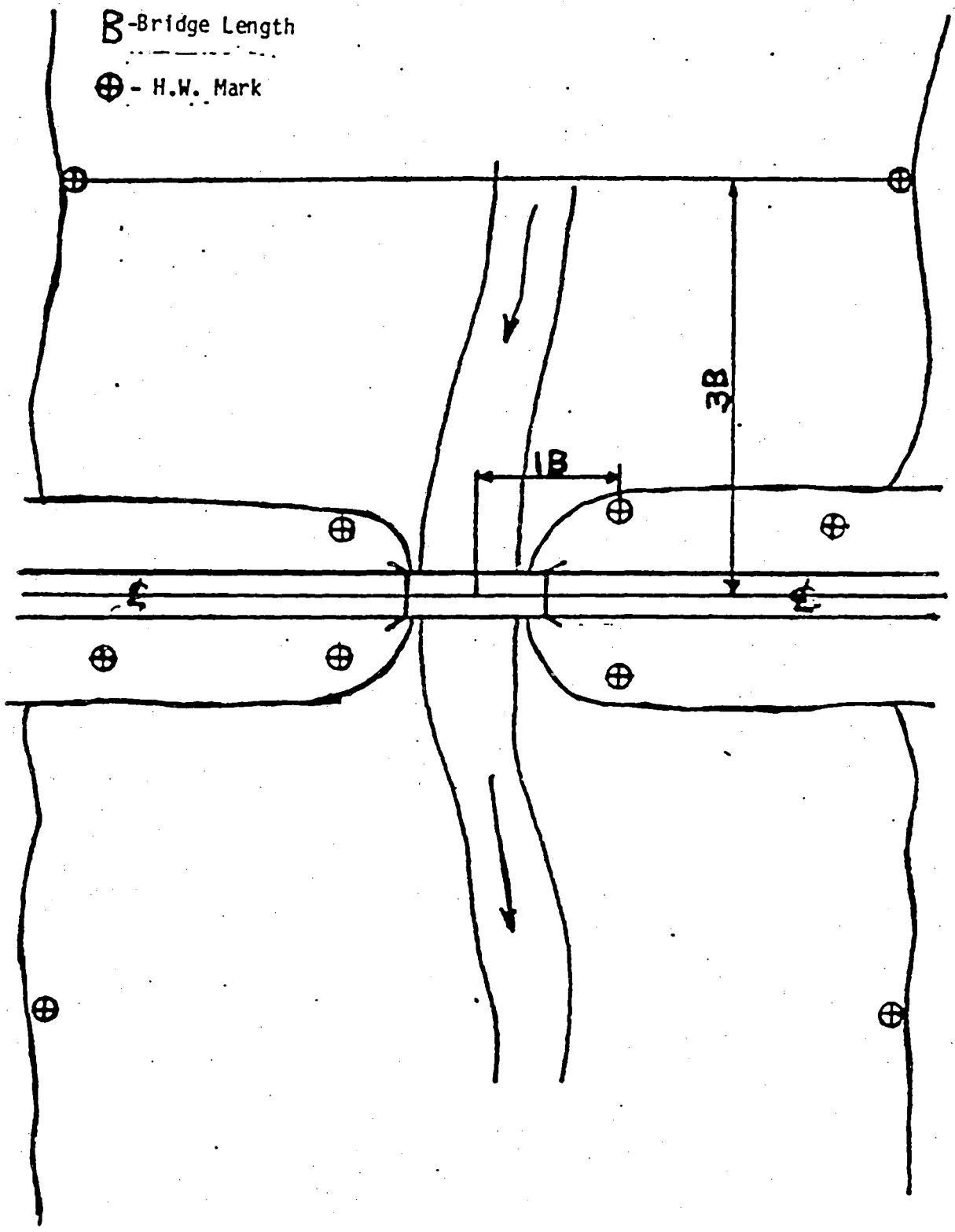
Set by _____

Source of Information: _____
_____

Elevation _____ **By** _____

Date _____

Remarks:


B-Bridge Length
⊕ - H.W. Mark
3B
1B
℄
℄

Appendix I

Wing Dikes

COMPUTING WING DIKE LENGTHS

1. To find "Station Location" for "Long" dike.
   Point = (Y + 38 Tan $\emptyset$) ± Sta. of ℄ Brg.

   To find "Station Location" for "Short" dike.
   Point = (38 Tan $\emptyset$ - Y) ± Sta. of ℄ brg.

2. "Long" wing dike $= \left(\frac{\text{Bridge Length*}}{2} - 38\right) \frac{1}{\cos(\emptyset + 20)}$

3. ($\emptyset > 20°$) "Short" wing dike $= \left(\frac{\text{Bridge Length*}}{2} - 38\right) \frac{1}{\cos(\emptyset - 20°)}$

4. ($\emptyset \leq 20°$) "Short" wing dike $= \left(\frac{\text{Bridge Length*}}{2} - 38\right) \frac{1}{\cos(20° - \emptyset)}$

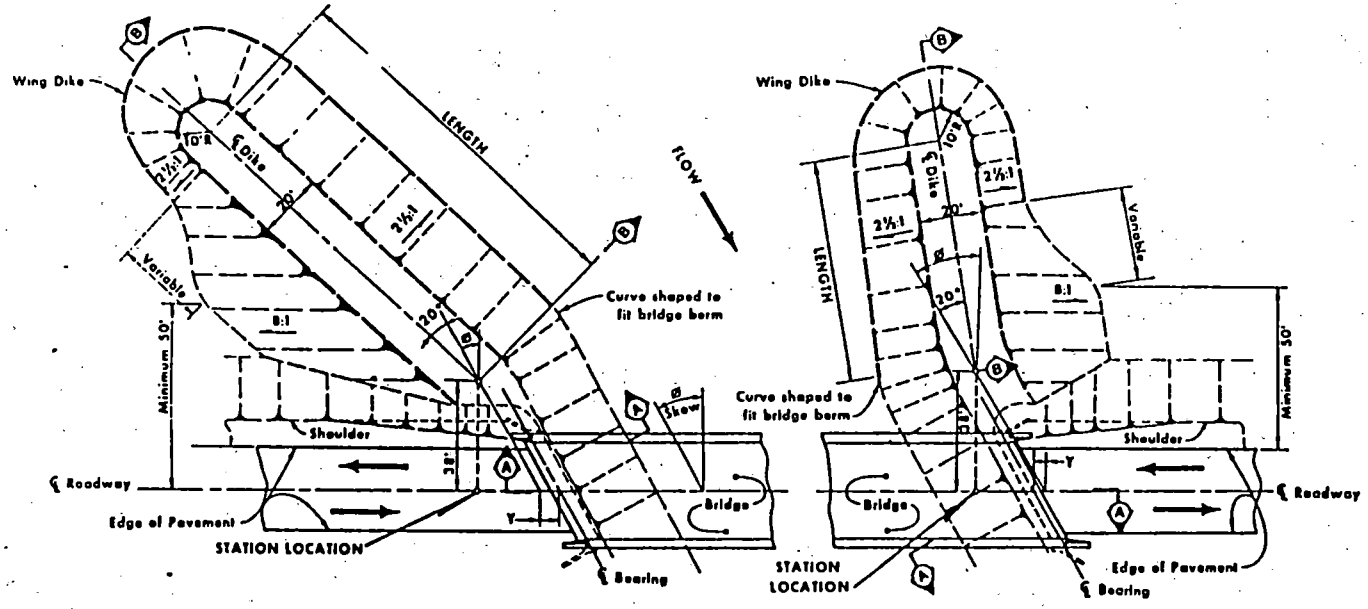
*If bridge length is 150' or less use 150' as bridge length. If bridge length is 250' or more use 250' as bridge length.

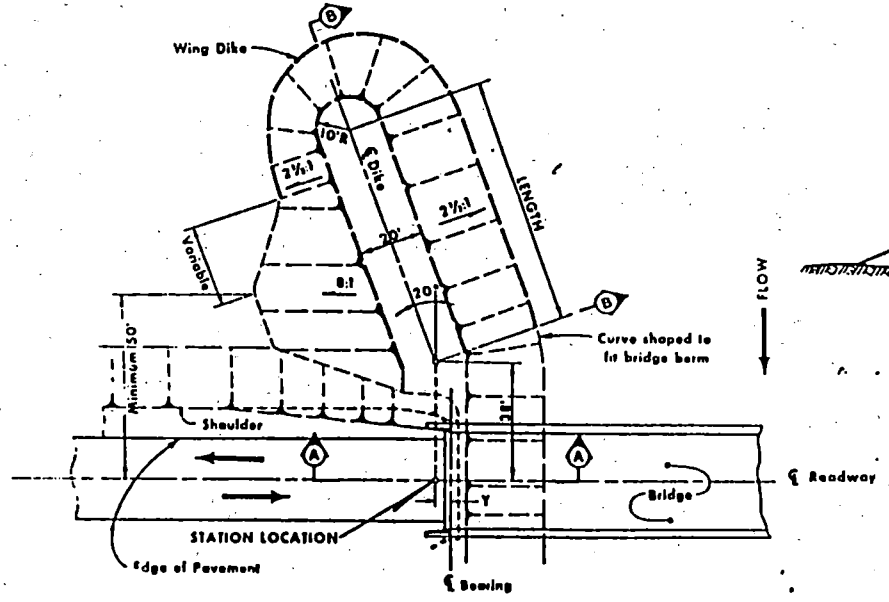
TABLE FOR WING DIKE LENGTHS, IN FEET

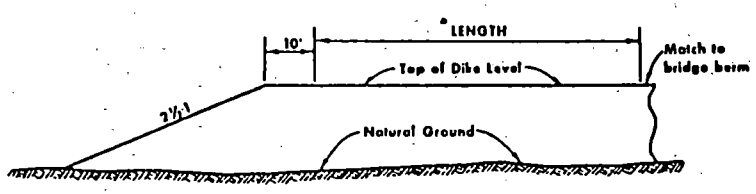
Bridge Length* Feet and Inches	Br. Skew = 0°	Br. Skew = 15°		Br. Skew = 30°		Br. Skew = 45°	
	Equal	Long	Short	Long	Short	Long	Short
150 or Shorter	39	45	37	58	38	88	41
151-4	40	46	38	59	38	89	42
163-10	47	54	44	68	45	104	48
176-4	53	61	50	78	51	119	55
188-10	60	69	57	88	57	134	62
201-4	67	77	63	97	64	148	69
213-10	73	84	69	107	70	163	76
226-4	80	92	75	117	76	178	83
243	89	102	84	130	85	198	92
250 or Longer	93	106	87	135	88	206	96

GENERAL NOTES

Foreslopes of wing dike should be adjusted to meet local standards.
Wing dikes are recommended any time that there is significant over bank flow at the crossing.
If there is a problem with ROW etc. a shortened wing dike is better than no wing dike.

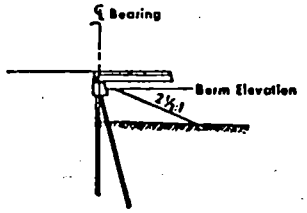






SECTION B-B

SKEW ANGLE β	DIMENSION Y
0° Thru 30°	5.5'/Cos β
30° Thru 45°	4.5'/Cos β
More than 45°	3.5'/Cos β



SECTION A-A

GENERAL NOTES:

Dikes shall be constructed as indicated hereon except when otherwise shown on detail plans. Method of construction shall be as specified for "Embankments" in current Standard Specifications.

For skewed bridges, one wing dike makes an angle with roadway ℄ of (Skew + 20°) and the other dike (Skew - 20°). See details this sheet. Method of location shall be similar when direction of "Flow" or "Skew" is opposite that indicated.

At locations where a portion of wing dike would be within 50 feet of the edge of traffic lane for approaching traffic, that portion of dike shall be constructed with a slope of 8:1 parallel to traffic. The stream side slope of wing dike shall be 2½:1 as shown.

Earthwork for construction of dikes is included in estimate of quantities for excavation. Cost of finishing dike or other work involved in completing dike as directed shall be considered incidental to excavation.

Top of dike elevation will be the same as berm elevation unless otherwise noted.

Iowa Department of Transportation
Highway Division

STANDARD ROAD PLAN **RL-3**

George F. Sisson 05-23-90
RECOMMENDED BY ROAD DESIGN ENGINEER DATE

D.W. Anderson 05-23-90
APPROVED BY DEPUTY DIRECTOR OF DEVELOPMENT DATE

DETAILS FOR STANDARD WING DIKES

Appendix J

Hydraulics Publications

SELECTED FHWA HYDRAULICS PUBLICATIONS (April 1994)

The PUBLICATIONS listed below are available from NTIS, National Technical Information Service, 5285 Port Royal Rd, Springfield, VA 22161, (703) 487-4650.

The MICROCOMPUTER SOFTWARE and related publications are available from:
McTRANS - 512 Weil Hall, Univ. of Florida, Gainesville, FL 32611-2083.
(904) 392-0378, FAX (904) 392-3224, Messages 1-800-226-1013
PC-TRANS - 2011 Learned Hall, Lawrence, KS 66045
(913) 864-5655, FAX (913) 864-3199

NO COPIES ARE AVAILABLE FROM FHWA

	HYDRAULIC DESIGN SERIES (HDS)	YEAR	FHWA-#	NTIS-#
HDS 1	Hydraulics of Bridge Waterways	1978	EPD-86-101	PB86-181708
HDS 2	Superseded by HEC 19			
HDS 3	Design Charts for Open-Channel Flow	1961	EPD-86-102	PB86-179249
HDS 4	Design of Roadside Drainage Channels	1965	EPD-86-103	PB86-180288
HDS 5	Hydraulic Design of Highway Culverts	1985	IP-85-15	PB86-196961

	HYDRAULIC ENGINEERING CIRCULARS (HEC)	YEAR	FHWA-#	NTIS-#
HEC 1	Selected Bibliography of Hydraulic and Hydrologic Subjects	1983	EPD-86-104	PB86-179256
HEC 2	3 and 4 are superseded by HEC19			
HEC 5	Hydraulic Charts for the Selection of Highway Culverts, superseded by HDS 5	1965	EPD-86-105	PB86-181138
HEC 6	Superseded by HDS 4			
HEC 7	and 8 are superseded by HY 8 and HDS 5			
HEC 9	Debris-Control Structures	1971	EPD-86-106	PB86-17980
HEC 10	Capacity Charts for the Hydraulic Design of Highway Culverts	1972	EPD-86-107	PB86-1856
HEC 11	Design of Riprap Revetment	1989	IP-89-016	PB89-218424
HEC 12	Drainage of Highway Pavements	1984	TS-84-202	PB84-215003
HEC 13	Hydraulic Design of Improved Inlets for Culverts, superseded by HDS 5	1972	EPD-86-109	PB86-179710
HEC 14	Hydraulic Design of Energy Dissipators for Culverts and Channels	1983	EPD-86-110	PB86-180205
HEC 15	Des. of Roadside Channels w. Flexible Linings	1988	IP-87-7	PB89-122584
HEC 16	Superseded by HIRE (see below)			
HEC 17	The Design of Encroachments on Flood Plains Using Risk Analysis	1981	EPD-86-112	PB86-182110
HEC 18	Evaluating Scour at Bridges, Edition 2	1993	IP-90-017	PB93-186138
HEC 19	Hydrology	1984	IP-84-15	PB85-182954
HEC 20	Stream Stability at Highway Structures	1991	IP-90-014	PB91-198788
HEC 21	Bridge Deck Drainage Systems	1993	SA-92-010	

	IMPLEMENTATION REPORTS (IMP)	YEAR	FHWA-#	NTIS-#
HIRE	Highways in the River Environment	1990	HI-90-016	PB90-252479
IMP	Design of Urban Highway Drainage	1979	TS-79-225	PB83-259903
IMP	Underground Disposal of Storm Water Runoff, Design Guidelines Manual	1980	TS-80-218	PB83-180257
IMP	Manual for Highway Storm Water Pumping Stations Volume 1	1982	IP-82-17, V1	PB84-152727
	Volume 2 (Apdx)	1982	IP-82-17, V2	PB84-152785
IMP	Guide for Selecting Manning's Roughness Coef. for Nat. Channels & Flood Plains	1984	TS-84-204	PB84-242585
IMP	Culvert Inspection Manual	1986	IP-86-2	PB87-151809
IMP	Use of Riprap for Bank Protection (Lit Rev)	1986	TS-86-211	PB86-217197

	MICROCOMPUTER SOFTWARE AT MCTRANS	YEAR	MCTRANS	FHWA-#	NTIS-#
	Bridge Waterways Analysis Model	1986	WSPRO		
	WSPRO Research Report	1986	WSPRO.D	RD-86-108	PB87-216107
	WSPRO Users Manual (Version P60188)	1990	WSPRO.D	IP-89-27	PB91-218420
HY 8	FHWA Culvert Analysis (Version 4.3)	1994	HY8		
	Hydraulic Des. of Highway Culverts	1985	HY8.D	IP-85-15	PB86-196961
	Research Report (Version 1.0)	1987	HY8.D		
	HY 8 Applications Guide	1987	HY8.D	ED-87-101	NA
HY 9	Scour at Bridges (Version 4.0)	1991	SCOUR		
	HEC 18. Evaluating Scour at Bridges	1991	SCOUR.D	IP-90-017	PB91-198739
	HEC 20. Stream Stability at ...	1991	SCOUR.DS	IP-90-014	PB91-198788
HY 10	BOXCAR (Version 1.0)	1989	BOXCAR		
	BOXCAR Users Manual	1989	BOXCAR.D	IP-89-018	PB90-115486
	Structural Design Manual	1983	BOXCAR.DS	IP-83-6	PB84-153485
	PIPECAR (Version 2.0)	1993	PIPECAR		
	PIPECAR Users Manual	1989	PIPECAR.D	IP-89-019	PB90-115478
	Structural Design Manual	1983	PIPECAR.DS	IP-83-6	PB84-153485
	CMPCHECK (Version 1.0)	1989	CMPCHECK		
HY 11	Preliminary Analysis System for WSP	1989	PAS		
	PAS USERS MANUAL	1989	PAS.D	IP-89-013	PB90-112723
HY 12	FESWMS-2DH	1989	FESWMS		
	FESWMS-2DH. Users Manual	1989	FESWMS.D	RD-88-177	NA
	FESWMS-2DH. Research Report	1989	FESWMS.DS	RD-88-146	PB91-106492
HY TB	Hydraulic Toolbox (HEC 12. 14. & 15)	1989	HYDTOOL		
	HEC's 12. 14. and 15	1989	HYDTOOL.D		
CANDE	CANDE-89	1989	CANDE		
	CANDE. Users Manual	1989	CANDE.D	RD-89-169	NA
HYDRAIN	Drainage Design System (Version 5)	1994	HYDRAIN		
	HYDRAIN Users Manual (hard copy & WP)	1994	HYDRAIN.D		

	MAINFRAME AND CALCULATOR SOFTWARE	YEAR	FHWA-#	NTIS-#
HY	Hydr. Analysis of Pipe-Arch Culv.	1969	EPD-86-113	PB86-179272
HY 4	Hydraulics of Bridge Waterways	1969	EPD-86-114	PB86-181351
HY 5	Superseded by USGS WATSTORE			
HY 6	Hydraulic Analysis of Culverts	1979	EPD-86-115	PB86-180031
CDS 2	HP-65. Hydr. Design of Culverts	1980	EPD-86-117	PB86-182128
CDS 3	TI-59. Hydr. Design of Culverts	1981	EPD-86-119	PB86-182144
CDS 5	TI-59. Hydr. Design of Pumping Stations	1982	EPD-86-119	PB86-182144

	RESEARCH REPORTS	YEAR	FHWA-#	NTIS-#
RES	Approx. Method for Computing Backwater Profiles in Corrugated Metal Pipes	1976	RD-76-42	PB-263915
RES	Countermeasures for Hydraulic Problems at Bridges. Vol 1 Analysis and Assess.	1978	RD-78-162	PB-297132
	Vol 2. Case Histories for Sites 1-283	1978	RD-78-163	PB-297685
RES	Streambank Stabilization. Exec. Sum.	1985	RD-84-099	PB86-186848
RES	Streambank Stabilization Measures	1985	RD-84-100	PB86-187986
RES	Design of Spur-Type Streambank Stabilization	1985	RD-84-101	PB86-186830
RES	Development of a Methodology for Estimating Embankment Damage due to Flood Overtopping	1986	RD-86-126	PB87-178356
RES	Lab Report for the Acosta Bridge Scour Study	1990	RD-89-114	PB91-174052
RES	Hydr. Stability of Articulated Concrete Block Revetment Systems During Overtopping Flow	1990	RD-89-199	PB90-266156
RES	Minimizing Embank. Damages During Overtopping	1990	RD-88-181	PB90-266107
RES	Cost-Effective Roadway Drainage Design Using Economic Analysis	1990	RD-88-126	PB91-104497
RES	HPNPA. Critical Substructure Bridge Elements	1990	RD-90-054	NA
RES	Proceedings of the Bridge Scour Symposium	1990	RD-90-035	PB93-167369
RES	Lab. of Rock Riprap for Prot. at Abutments	1991	RD-91-057	PB93-174639
RES	Lab. of Riprap Used to Protect Bridge Piers	1991	RD-91-063	PB91-236315
RES	Strategies for Managing Unknown Bridge Found.	1994	RD-92-030	

Appendix K

Tapered Inlet Culverts

Design Guidelines for Slope Tapered Box Culverts

The purpose of slope tapered box culverts is to reduce construction costs by using a smaller barrel but still providing acceptable hydraulic capacity and upstream headwater. These special inlets have been used in Iowa and across the country since the 1950's or earlier. The design of these inlets includes rigid hydraulic design and good construction practice.

The culvert site normally will meet two basic requirements to qualify for a tapered inlet. The first is that the additional design costs are offset by the reduction in construction costs. The second is that the site must have enough fall for the design to perform properly, typically at least six to eight feet.

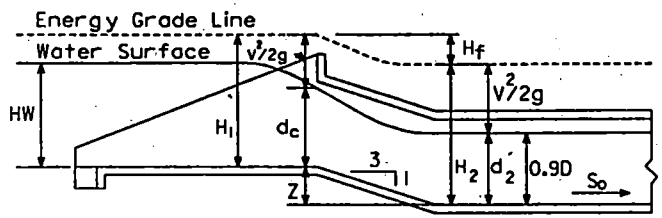
The culvert inlet is made large enough to keep the depth of water at the entrance within allowable limits. The slope taper section "funnels" the water down a steep slope as the culvert width decreases. The barrel section is designed to flow nearly full when carrying the design discharge. Generally the outlet has a flume and basin for energy dissipation.

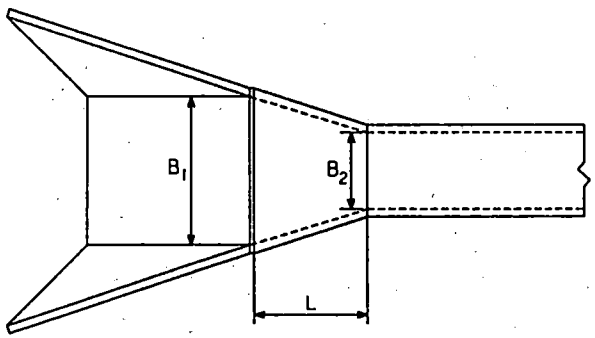
There are five basic steps for the hydraulic design a box culvert with a slope tapered inlet.

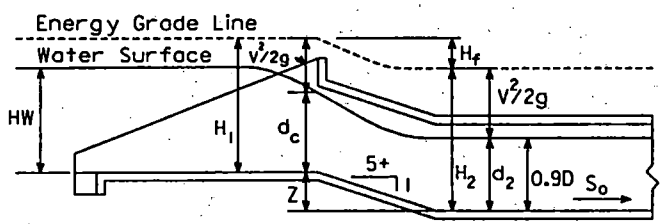
1. Determine the design discharge. The Iowa Runoff Chart shall be used for rural watersheds draining 1000 acres (400 hectares) or less.
2. Determine the allowable depth of water at the inlet. Typically, the Iowa DOT allows one foot (0.3 m) of water above the top of the inlet.
3. Select an inlet size that results in a flow depth less than or equal to the allowable. Inlet control nomographs from FHWA's "Hydraulic Design of Highway Culverts", HDS No. 5, can be used for this.
4. Select a barrel size and slope that results in the barrel flowing less than full. The barrel height should be the same as the inlet, while the barrel width should generally be no less than 50 to 60% of the inlet width. Select a slope steep enough to maintain supercritical flow. Charts in FHWA's "Design Charts for Open-Channel Flow", HDS No. 3, have been developed from Manning's equation and can be used to select the appropriate slope.
5. Determine the drop and length of the slope tapered section. The minimum drop needed is the specific energy at the inlet (H_1) minus the specific energy at the barrel (H_2) plus energy losses (H_f). Specific energy is the depth plus velocity head at a given location.

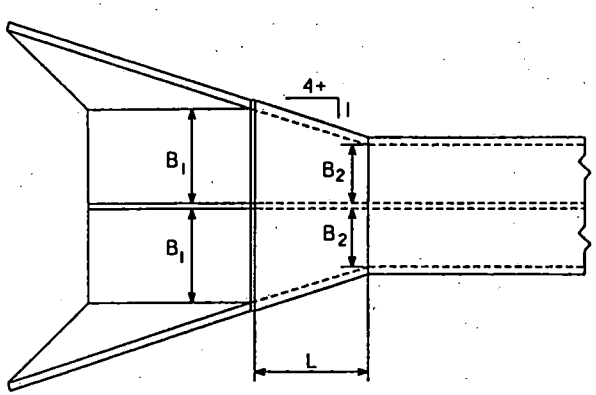
The following guidelines, charts and worksheets (English and metric units) are provided to assist in the hydraulic design.

When the inlet will be raised significantly to create a pond, geotechnical concerns must be considered to ensure that seepage through the embankment is not excessive.









Filename: s:\users\bridge\prelim\snielse\cadd\files\hydro.ssn

Iowa Department of Transportation
Office of Bridges and Structures
(10/96)

E

Hydraulic Information Chart for English Slope Tapered Box Culverts.

General Guidelines:

1. *HW from inlet control charts for proposed inlet size, no greater than D+2 ft.*
2. *The height (D) of the structure does not change.*
3. *Calculated Z may be rounded to the next higher increment as described below. Minimum Z=3 ft.*
4. *Taper can be designed by using the RCB standard reinforced steel pattern of inlet size for the entire length of the taper and varying the length of the transverse steel.*
5. *The barrel outlet flowline is usually set at least 1/2 (D) above stream bed. This prevents the barrel from "drowning out".*
6. *The outlet usually has a flume with a basin that is buried 4 ft. to 6 ft. below stream bed, to help dissipate energy.*
7. *The barrel slope (S_o) should generally be 1.5 % or steeper in order to maintain supercritical flow and the maximum flow depth of 0.9D in the barrel. (See "Design Charts for Open Channel Flow", HDS No. 3, FHWA, to determine specific flow depths for various slopes.)*
8. *An attempt should be made to design barrel sizes to conform with standard RCB sizes. This may mean starting with a "wide" non-standard inlet.*
9. *Assume energy loss, H_f =0.2 ft. for all cases.*

HW – Headwater from inlet control charts
H_1 – Specific energy head at inlet
H_2 – Specific energy head at barrel
B_1 – Width of inlet opening
B_2 – Width of barrel opening
D – Height of opening
H_f – Energy loss
d_c – Critical depth
Z – Drop in flowline required
L – Length of taper section
S_o – Slope of barrel
$\frac{V^2}{2g}$ – Velocity head

Guidelines for single RCB's

1. *Use drop rate (L / Z) of approx. 3:1.*
2. *Ratio of barrel width to inlet width (B2 / B1) should be 50% or greater.*
3. *For Z=3 ft., use L=10 ft. For Z=4 ft., use L=12 ft. For Z=5 ft., use L=15 ft.*

Guidelines for Twin RCB's

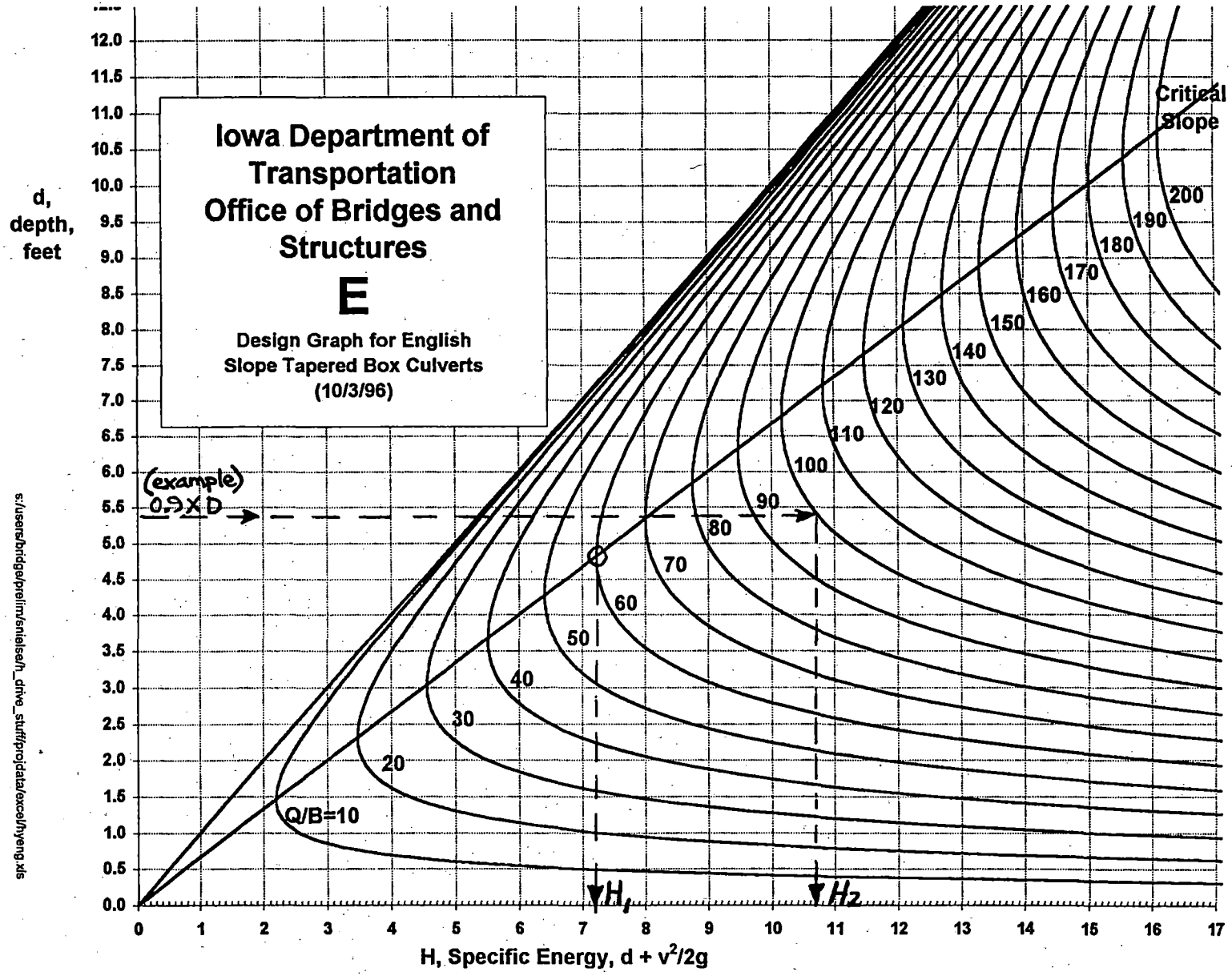
1. *Use drop rate (L / Z) of 5:1 (min.)*
2. *Ratio of barrel width to inlet width (B2 / B1) should be 60% or greater.*
3. *L is determined either by (B1 – B2) x 4 or Z x 5, whichever is greater. This insures a minimum side taper of 4:1. L should generally be in 5 ft. increments.*

Worksheet for Slope Tapered RCB Culverts (English)

Project_____ County_____ Des. No._____

Sta._____ Designer_____ Date_____

Variable	Example	Trial 1	Trial 2	Trial 3	Trial 4
Design Q, ft^3/sec	600				
Inlet Section					
B_1 X D, ft x ft (size of inlet)	10 X 6				
HW, ft (from HDS #5 nomographs)	7.5				
Q/B_1	60				
d_c, ft (from Chart)	4.8				
H_1, ft (from Chart)	7.2				
Barrel Section					
B_2 X D, ft x ft (size of barrel)	6 X 6				
Q/B_2	100				
0.9 X D, ft	5.4				
H_2, ft (from Chart)	10.7				
Slope Tapered Section					
H_f, ft (assumed)	0.2	0.2	0.2	0.2	0.2
Z, ft ($= H_2 - H_1 + H_f$)	3.7				
Selected Z, ft	4.0				
Selected L, ft	12				
Barrel Slope					
$d_n = 0.9$ X D, ft	5.4				
Min. Slope, % (from HDS No. 3 or Mannning's equation)	1.5				
Is the design acceptable?	Yes				



K-5

s:/users/bridge/prelim/snielsen/h_drive_stuff/projdata/excel/hyeng.xls

Appendix L

Hydrology

Iowa Runoff Chart

In the 1950's, the Iowa State Highway Commission (now Iowa DOT) adapted Bureau of Public Roads' Chart 1021.1, "Highway Drainage Manual", 1950. (BPR's chart was adapted from original work performed by W.D. Potter, "Surface Runoff from Small Agricultural Watersheds," Research Report No. 11-B, (Illinois) Highway Research Board, 1950.) The Iowa Runoff Chart has been widely used by IDOT and the counties since then.

The chart is self-explanatory. However, its use does require the exercise of judgement in selecting the land use and land slope factors. It can be used for rural watersheds draining up to 1000 acres.

The following is intended to aid that judgement:

1. Very Hilly Land—is best typified by the bluffs bordering the Mississippi and the Missouri Rivers. This terrain is practically mountainous (for Iowa) in character. Small areas of very hilly land can be found in all parts of the state. Typically, they can be found near the edge of the flood plains of the major rivers.

2. Hilly Land—is best typified by the rolling hills of south central Iowa. Interstate 35 in Clarke and Warren Counties traverses many hilly watersheds. Small areas of hilly land can be found in all parts of the state.

3. Rolling Land—is best typified by the more gently rolling farm lands of central Iowa. Interstate 80 in Cass and Adair Counties traverses many rolling watersheds. Small areas of rolling land can be found in all parts of the state.

4. Flat Land—is best typified by the farm lands of the north central part of the state. U.S. 69 traverses many flat watersheds in Hamilton and Wright Counties. Small areas of flat land can be found in all areas of the state.

5. Very Flat Land—is best typified by the Missouri River flood plain. Interstate 29 is located on this type of land for most of its length. Much of Dickinson, Emmet, Kossuth, Winnebago and Palo Alto Counties are also in this classification. Small areas of very flat land can be found in all parts of the state.

Use this chart only for rural watersheds and the limitations of drainage areas listed below. The equations were developed by finding the best statistical fit to the curve on the Runoff Chart. At the larger drainage areas (600 to 1000 acres), the equation overestimates Q taken from the Chart by up to 7%. In most cases, however, this would not result in a larger culvert size. If the designer questions the equation results, use the curve on the Chart. Be aware that error (overestimating or underestimating) may also result from interpolating the Q from the curve.

English equation

For drainage areas, $2 < A < 1000$ acres

$Q_{design} = LF \times FF \times Q$, where $Q = 8.124\ A^{0.739}$

Q is in ft^3/sec

A is in acres

Metric equation

For drainage areas, $1 < A < 400$ hectares

$Q_{design} = LF \times FF \times Q$, where $Q = 0.446\ A^{0.740}$

Q is in m^3/sec

A is in hectares

Frequency Factor (FF)

Frequency, years	5	10	25	50	100
Factor, FF	0.5	0.7	0.8	1.0	1.2

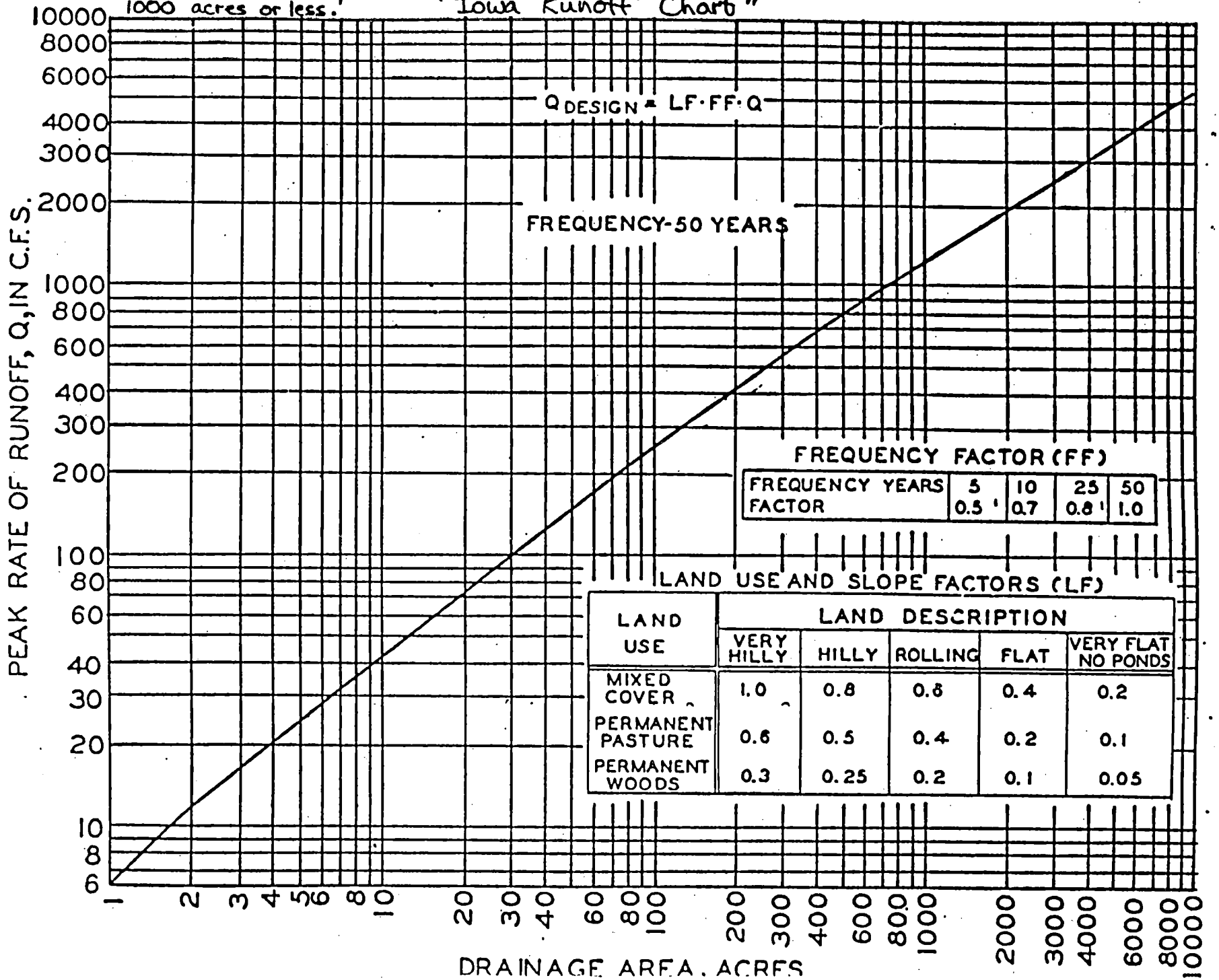
Land Use and Slope Description (LF)

Land Use	Land Description				
	Very Hilly	Hilly	Rolling	Flat	Very Flat (no ponds)
Mixed Cover	1.0	0.8	0.6	0.4	0.2
Permanent Pasture	0.6	0.5	0.4	0.2	0.1
Permanent Woods	0.3	0.25	0.2	0.1	0.05

PEAK F_S OF RUNOFF

"Iowa Runoff Chart"

Use for drainage areas approximately 1000 acres or less.

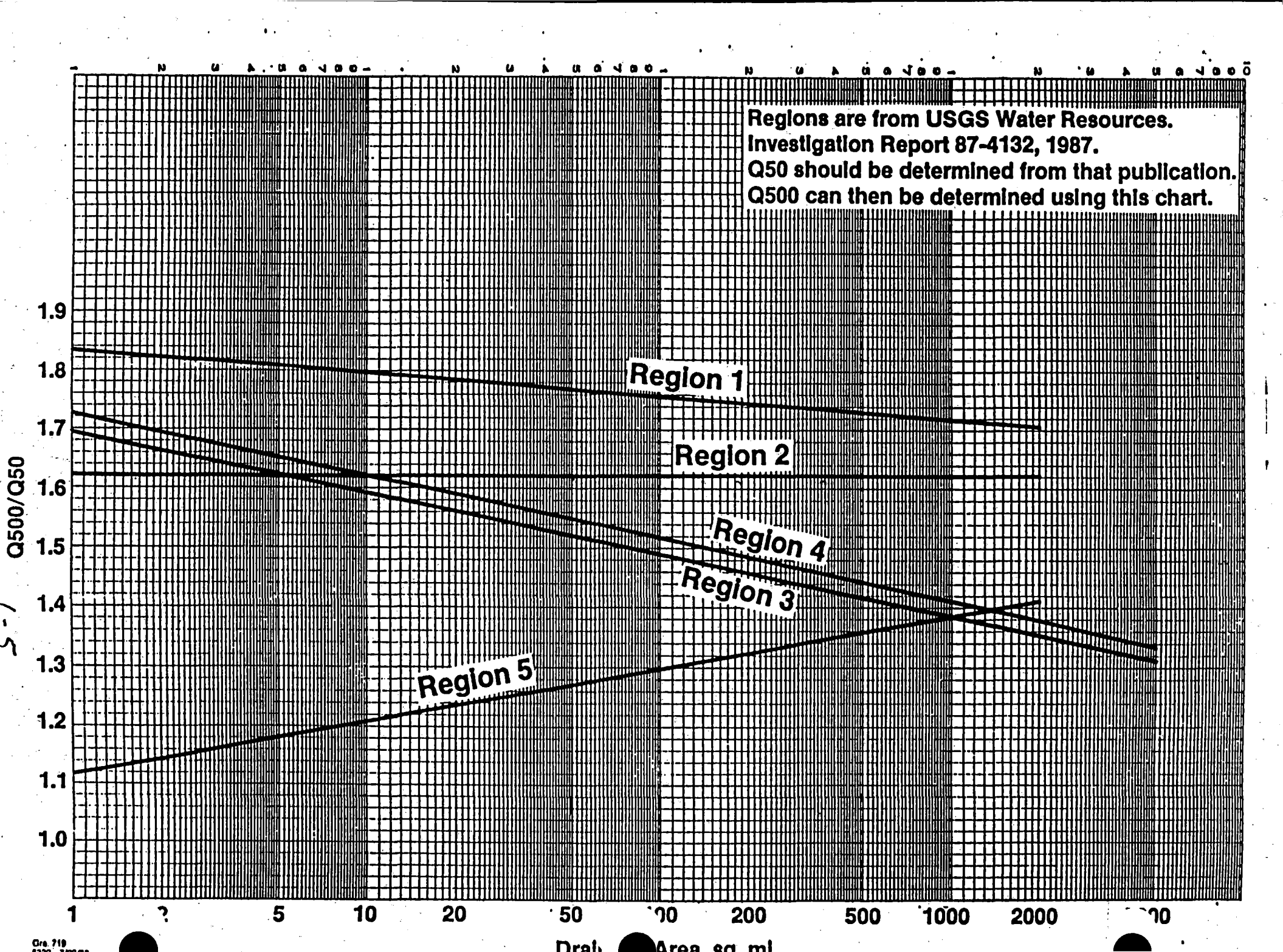


FREQUENCY FACTOR (FF)

FREQUENCY YEARS	5	10	25	50
FACTOR	0.5	0.7	0.8	1.0

LAND USE AND SLOPE FACTORS (LF)

LAND USE	LAND DESCRIPTION				
	VERY HILLY	HILLY	ROLLING	FLAT	VERY FLAT NO PONDS
MIXED COVER	1.0	0.8	0.6	0.4	0.2
PERMANENT PASTURE	0.6	0.5	0.4	0.2	0.1
PERMANENT WOODS	0.3	0.25	0.2	0.1	0.05


Regions are from USGS Water Resources.
Investigation Report 87-4132, 1987.
Q50 should be determined from that publication.
Q500 can then be determined using this chart.
Region 1
Region 2
Region 4
Region 3
Region 5
Q500/Q50
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
1
5
10
20
50
200
500
1000
2000
Area, sq. mi

Appendix M

Hydraulic Calculations

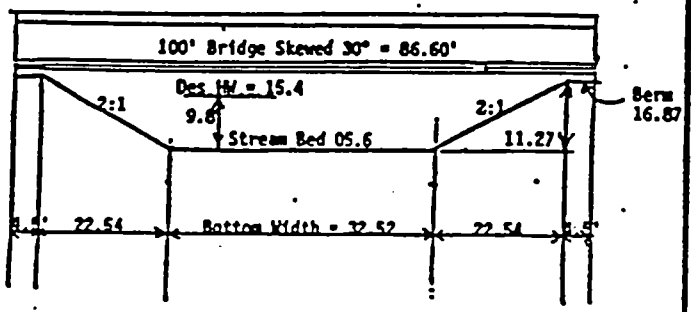
TO: County Engineer

FROM: Darrell Coy
Bridge Design
I. D.O.T.

100' x 30° CCS Bridge
GIVEN: Berm Elevation -- 16.87
Stream Bed ----- 05.6
Design Highwater- 15.4
Skewed ---------- 30°
4.5' Berms
2:1 Berm Slope

FIND: Area of Opening Below Desigh High Water

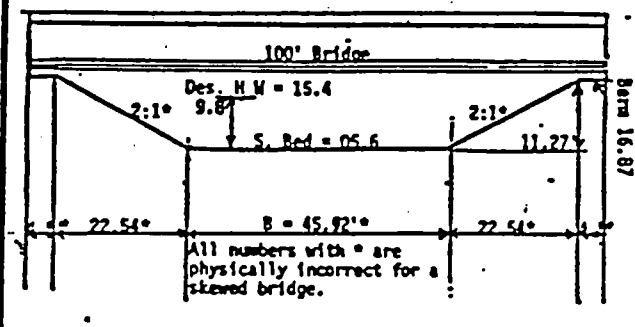
1. CORRECT WAY TO GET CORRECT ANSWER



B = 86.60 - (4.5 + 22.54 + 22.54 + 4.5)
= 86.60 - 54.08
= 32.52 ft.

A = 9.8 [32.52 + 9.8(2)]
= 9.8 [52.12]
= 510.78 ft.^{2}
(Minus Pier Area)

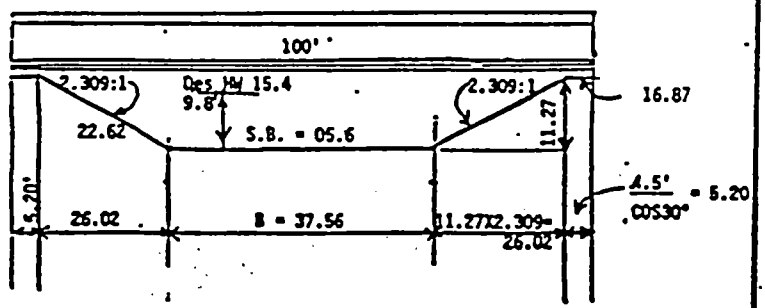
2. WRONG WAY (GIVES YOU INCORRECT ANSWER)



B = 100 - (4.5 + 22.54 + 22.54 + 4.5)
= 45.92 ft
Area = 9.8 [45.92 + (9.8) (2)]
= 642.10 Ft.^{2}

THEN SKEW 30°
A = 642.10 X COS 30±
= 642.10 X 0.8660254
= 556.07 ft.^{2} WRONG!!!!!!!
(Minus Pier Area)

3. THE DIFFICULT WAY TO GET THE CORRECT ANSWER
However, it proves that method 1 is correct.
The larger skews give larger errors.



Slopes = $\frac{2}{\cos 30°}$ = 2.309 to 1

Bottom = 100 - (5.20 + 26.02 + 26.02 + 5.20)
= 100 - 62.44
= 37.56 Ft.

A = 9.8 [37.56 + (9.8 X 2.309)]
= 9.8 [37.56 + 22.62]
= 9.8 [60.18]
= 589.76 ft.
THEN Skew 30°
A = 589.76 X COS 30°
= 589.76 X 0.8660254
= 510.75 Ft.^{2}
(Minus Pier Area)

A significant number of bridge plans have been received where the waterway area was computed using the method shown in number 2 above. At first glance this method seems plausible since the cosine of the skew angle is used. However, computations in method 3 show that you must use the cosine of the skew angle twice in arriving at the correct answer using this approach.

Method 1 shown above is the most straight forward method in arriving at the correct answer.

Using method 2 gives you the following errors for this bridge:

Skew	Error
15°	1.9%
30%	8.8%
45°	28.0%

(% error varies with length & depth)

Please go over this information with the members of your staff that comp the hydraulics of your bridges.

D. Coy.

12/14/87

2-2-91

/// PROGRAM PCVAL (REVISED ON 8-11-1987) ///
ENTER ID (MAX 70 CHAR) :IM 3.131 SAMPLE PCVAL PROGRAM RUN Ⓔ
ENTER NUMBER OF CROSS SECTION SHOTS (MAX 30) :14 Ⓔ
ENTER OFFSET (X) & ELEV (Y) OF CROSS SECTION SHOTS
(1) :0 997 Ⓔ
(2) :92 995 Ⓔ
(3) :145 993 Ⓔ
(4) :275 991 Ⓔ Etc.
(5) :430 990
(6) :462 982.5
(7) :472 979.5
(8) :487 982.5
(9) :510 990
(10) :562 990
(11) :705 993
(12) :745 995
(13) :807 1000.9
(14) :900 10003 Ⓔ

INSTRUCTIONS FOR USING IDOT PCVAL PROGRAM
(As run from a Disk)

1. Bring your PC to a point where it is addressing the disk drive.
2. Type in: PCVAL
3. Type in underlined data.
4. Press Enter key at each Ⓔ sign.
5. Call 515-239-1487 (~~D. Coy~~ B. Barrett) if you have a problem.

LOW ELEV= 979.50 } upper & lower limits of rating curve
HIGH ELEV= 997.00 } using this data.

-> INPUT X & Y COORDINATES

1	0.00	997.00
2	92.00	995.00
3	145.00	993.00
4	275.00	991.00
5	430.00	990.00
6	462.00	982.50
7	472.00	979.50
8	487.00	982.50
9	510.00	990.00
10	562.00	990.00
11	705.00	993.00
12	745.00	995.00
13	807.00	1000.90
14	900.00	10003.00 ← Mistake

-> ANY CHANGES ? :y Ⓔ
ENTER SHOT NUMBER, OFFSET & ELEV.END ENTRY BY ENTERING "THREE ZEROES"
:14 900 1003 Ⓔ
:0 0 0 Ⓔ ← Note "THREE ZEROES" means 0 space 0 space 0

13 807.00 1000.90
14 900.00 1003.00 } Machine retypes all X & Y Coordinates
-> ANY CHANGES ? :n Ⓔ
ENTER SLOPE IN FT/MILE :4.75 Ⓔ
-> ANY CHANGES ? :n Ⓔ
ENTER ROUGHNESS REGION OFFSET (X) & ROUGHNESS (N) FROM L TO R
(1) :430 .07 Ⓔ
(2) :510 .03 Ⓔ
(3) :900 .07 Ⓔ

Design discharges
Q50 = 5200 cfs
Q25 = 4200 cfs

INPUT ROUGHNESS OFFSET X & N

(1)	430.000	0.070
(2)	510.000	0.030
(3)	900.000	0.070

-> ANY CHANGES ? :n Ⓔ

ENTER UPPER & LOWER LIMITS OF WATER ELEV & INCREMENTS :997 987 1 Ⓔ
-> ANY CHANGES ? :n Ⓔ

STD EL 997.00						
	1	3282	1.7	1909	109407	0.070
	2	7707	7.8	991	256960	0.030
	3	2418	1.9	1292	80608	0.070
TOTAL		13406	3.2	4191	446975	

Computer runs program. The results "flash" by on the screen. You can print them later in the program.

DO YOU WANT TO CALC SPECIFIC DESIGN DISCHARGES? :y Ⓔ
ENTER NUMBER OF DESIGN DISCHARGE DESIRED (0=NONE MAX 10) :2 Ⓔ
ENTER 2 DISCHARGES
(1) :5200 Ⓔ
(2) :4200 Ⓔ

	SECT	DQ CFS	V FPS	A SQ FT	CONVEY	N
STD EL 992.50						
	1	322	0.8	383	10737	0.070
	2	3633	5.8	631	121117	0.030
	3	246	0.9	279	8199	0.070
TOTAL		4201	3.2	1293	140053	

Same note as above.

ITERATION CYCLES= 23
DO YOU WANT TO PRINT OUT THE SCREEN OUTPUT DATA? :y Ⓔ
DO YOU WANT TO CHANGE INPUT DATA? :n Ⓔ
END OF JOB
End of Execution

The print out is as shown on page 2 of 3 and 3 of 3.

IN 3.13L SAMPLE FCVAL PROGRAM RUN

CORSS SECTION SHOTS

NO.	X	Y
1	0	997.0
2	72	995.0
3	145	993.0
4	275	991.0
5	430	990.0
6	442	982.5
7	472	979.5
8	487	982.5
9	510	990.0
10	562	990.0
11	705	993.0
12	745	995.0
13	807	1000.9
14	900	1003.0

SLOPE IN FEET/MILE..... 4.730

SECTION	DIST.	N VALUE
1	490	0.070
2	510	0.030
3	900	0.070

STAGE DATA
HIGH ELEV. 997.00 LOW ELVE. 987.00 INCREMENT. 1.00

	SECT	DQ CFS	V FPS	A SQ FT	CONVEY	N
STAGE ELEV. 987.00						
	1	0	0.0	0	0	0.070
	2	803	3.6	224	24760	0.030
	3	0	0.0	0	0	0.070
	TOTAL	803	3.6	224	24760	
STAGE ELEV. 988.00						
	1	0	0.0	0	0	0.070
	2	1111	3.9	284	37047	0.030
	3	0	0.0	0	0	0.070
	TOTAL	1111	3.9	284	37047	
STAGE ELEV. 989.00						
	1	0	0.0	0	0	0.070
	2	1484	4.2	353	49470	0.030
	3	0	0.0	0	0	0.070
	TOTAL	1484	4.2	353	49470	
STAGE ELEV. 990.00						
	1	0	0.0	0	0	0.070
	2	1923	4.5	431	64184	0.030
	3	0	0.0	0	0	0.070
	TOTAL	1923	4.5	431	64184	
STAGE ELEV. 991.00						
	1	91	0.4	78	1034	0.070
	2	2334	5.0	511	85234	0.030
	3	44	0.5	76	1342	0.070
	TOTAL	2428	4.0	665	87612	
STAGE ELEV. 992.00						
	1	191	0.7	265	4348	0.070
	2	3257	5.5	591	108404	0.030
	3	155	0.8	199	5174	0.070
	TOTAL	3604	3.4	1056	120148	
STAGE ELEV. 993.00						
	1	490	0.9	518	14350	0.070
	2	4025	6.0	671	134184	0.030
	3	362	1.0	371	12044	0.070
	TOTAL	4877	3.1	1559	162578	
STAGE ELEV. 994.00						
	1	987	1.2	816	22899	0.070
	2	4855	6.5	731	161883	0.030
	3	706	1.2	576	23548	0.070
	TOTAL	6549	3.1	2143	218330	

	SECT	DQ CFS	V FPS	A SQ FT	CONVEY	N
STAGE ELEV. 993.00						
	1	1633	1.4	1141	24461	0.070
	2	5747	4.9	831	191422	0.030
	3	1154	1.4	801	38443	0.070
	TOTAL	8535	3.1	2772	284347	
STAGE ELEV. 994.00						
	1	2272	1.4	1502	77102	0.070
	2	6699	7.4	911	223334	0.030
	3	1735	1.7	1041	37831	0.070
	TOTAL	10806	3.1	3454	340288	
STAGE ELEV. 997.00						
	1	3282	1.7	1909	109407	0.070
	2	7707	7.8	991	234960	0.030
	3	2418	1.9	1272	80608	0.070
	TOTAL	13406	3.2	4191	444975	

DESIGN DISCHARGE = 8200 CFS

	SECT	DQ CFS	V FPS	A SQ FT	CONVEY	N
STAGE ELEV. 992.21						
	1	581	1.0	578	19362	0.070
	2	4193	6.1	688	139790	0.030
	3	425	1.0	412	14175	0.070
	TOTAL	8199	3.1	1677	173347	

DESIGN DISCHARGE = 4200 CFS

	SECT	DQ CFS	V FPS	A SQ FT	CONVEY	N
STAGE ELEV. 992.00						
	1	322	0.8	383	10737	0.070
	2	3433	5.8	691	121117	0.030
	3	246	0.9	279	8199	0.070
	TOTAL	4201	3.2	1293	140053	

END OF JOB

	2	425	1.0	412	14175	0.070
	TOTAL	8199	3.1	1677	173347	

ITERATION CYCLES= 34

DESIGN DISCHARGE = .4200

	SECT	DQ CFS	V FPS	A SQ FT	CONVEY	N
STG EL 992.00						
	1	322	0.8	383	10737	0.070
	2	3433	5.8	691	121117	0.030
	3	246	0.9	279	8199	0.070
	TOTAL	4201	3.2	1293	140053	

ITERATION CYCLES= 23
DO YOU WANT TO PRINT OUT THE SCREEN OUTPUT DATA? ty
DO YOU WANT TO CHANGE INPUT DATA? tn
END OF JOB
End of Execution
Strike a key when ready . . .

Form 621026
10/90

FHWA HYDRAULIC DESIGN SERIES NO. 1
BACKWATER DETERMINATION WORKSHEET

County /City _____ Des. No. _____ Proj. _____

By _____ Date _____

Over _____

D.A. = _____ Slope: Reach = _____ Ft./Mi. _____ Ft./Ft.

Roughness Coefficients (Page 62) LOB _____ Bridge Skew _____

Channel _____ Pier Skew _____

ROB _____ Str. Bed El. _____

Flood Data: (USGS Report #87-4132)	Frequency				
	Discharge				
	Nat. Stage				
"b" Width					
Bridge Opening: (Page 6 & 7)	A_{n_2}				
	A_{n_2} Skewed				
	A_{piers}				
Flow Distribution: (Page 7)	Q_a				
	Q_b				
	Q_c				
	Q_{tot}				
$\frac{Q_c}{Q_{tot}}$ →	M				
K_b (Fig. 6)					
K_{pier} (Fig. 7)	J (Page 17)				
	σ (Fig 7B)				
	ΔK (Fig. 7A)				
	K_p (Page 16)				
K_{skew} (Fig. 10A)					
Eccentricity (Fig. 8)	e				
	K_e				
$K^*(=K_b + K_p + K_s + K_e)$ (Page 19)					
V_{n_2} $(=Q/A_{n_2})$					
h^* $(=(K^*)(1.5)(\frac{V_{n_2}^2}{2g}))$ (Page 13)					
Freeboard	(Low Structure El. — Nat. Stage El.)				

Form 740001wp
4-96

Iowa Department of Transportation

INSTRUCTIONAL MEMORANDUMS
To County Engineers

To	Date
County Engineers	November 1996
From	**IM No.**
Office of Local Systems	3.15

Subject

Highway Improvements in the Vicinity of Airports

To protect navigable airspace from encroachment, either construction operations or alterations, the Federal Aviation Administration (FAA) promulgated Federal Aviation Regulation, Part 77. This regulation defines the airspace next to an airport that requires a Notice of Proposed Construction or Alteration.

According to Part 77.13 (included in this Instructional Memorandum), Construction or Alteration Requiring Notice, the FAA has two requirements, one for airports with no runways longer than 3,200 feet and the other for airports with at least one runway more that 3,200 feet in length. If an elevation of 15 feet above the altered public highway exceeds an imaginary slope from the nearest point of the nearest runway, as described in the Imaginary Slopes (see page 2), then the controlling agency will submit FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the FAA. The controlling agency will submit this form to the FAA at least 30 days before final plan turn in, if the project is let at the Iowa Department of Transportation.

FAA Form 7460-1 can be obtained from:

Central Regional Office
Air Traffic Division, ACE-530
601 East 12th Street
Kansas City, MO 64106
Telephone 816-426-3408

Any highway project, with federal highway funds, shall be in compliance with Section 318, highway relocation due to airport, of Title 23 U.S.C.

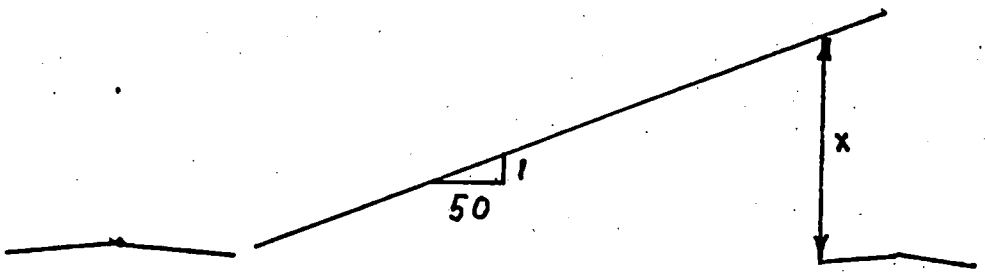
During activities on, or in proximity to, an airport, subject parties shall contact the airport manager and comply with FAA Advisory Circular No. 150/5370-2C, "Operational Safety on Airports During Construction", and FAA Advisory Circular No. 150/5210-5B, "Painting, Marking, and Lighting Of Vehicles Used on An Airport." In order to obtain FAA Advisory Circulars, contact the FAA at:

U.S. Department of Transportation
General Services Section, M-45.3
Washington , D.C. 20590
or call 800-322-7873

or contact the Office of Local Systems at 515-239-1528.

Imaginary Slopes

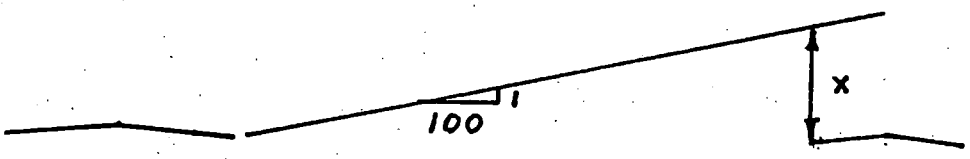
A. For airports with its runways no more than 3,200 feet in length, an imaginary slope of 50:1 will be used for a horizontal distance of 10,000 feet.



Runway Highway

If "x" is less than 15 feet, then FAA Form 7460-1 must be completed and submitted to the FAA.

B. For airports with at least one runway more than 3,200 feet in length, an imaginary slope of 100:1 will be used for a horizontal distance of 20,000 feet.



Runway Highway

If "x" is less than 15 feet, then FAA Form 7460-1 must be completed and submitted to the FAA.

Attachment: Notice of Proposed Construction of Alteration

NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION

§77.13 Construction or alteration requiring notice.

(a) Except as provided in §77.15, each sponsor who proposes any of the following construction or alteration shall notify the Administrator in the form and manner prescribed in §77.17:

(1) Any construction or alteration of more than 200 feet in height above the ground level at its site.

(2) Any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes:

(i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in subparagraph (5) of this paragraph with at least one runway more than 3,200 feet in actual length, excluding heliports.
(ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in subparagraph (5) of this paragraph with its longest runway no more than 3,200 feet in actual length, excluding heliports.
(iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport specified in subparagraph (5) of this paragraph.

(3) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad, and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of subparagraph (1) or (2) of this paragraph.

(4) When requested by the FAA, any construction or alteration that would be in an instrument approach area (defined in the FAA standards governing instrument approach procedures) and available information indicates it might exceed a standard of Subpart C of this part.

(5) Any construction or alteration on any of the following airports (including heliports):
(i) An airport that is available for public use and is listed in the Airport Directory of the current Airman's Information Manual or in either the Alaska or Pacific Airman's Guide and Chart Supplement.
(ii) An airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and except for military airports, it is clearly indicated that that airport will be available for public use.
(iii) An airport that is operated by an armed force of the United States.

(b) Each sponsor who proposes construction or alteration that is the subject of a notice under paragraph (a) of this section and is advised by an FAA regional office that a supplemental notice is required shall submit that notice on a prescribed form to be received by the FAA regional office at least 48 hours before the start of the construction or alteration.

(c) Each sponsor who undertakes construction or alteration that is the subject of a notice under paragraph (a) of this section shall, within 5 days after that construction or alteration reaches its greatest height, submit a supplemental notice on a prescribed form to the FAA regional office having jurisdiction over the area involved, if—

(1) The construction or alteration is more than 200 feet above the surface level of its site; or
(2) An FAA regional office advises him that submission of the form is required.

§77.15 Construction or alteration not requiring notice.

No person is required to notify the Administrator for any of the following construction or alteration:

(a) Any object that would be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town, or settlement where it is evident beyond all reasonable doubt that the structure so shielded will not adversely affect safety in air navigation.

(b) Any antenna structure of 20 feet or less in height except one that would increase the height of another antenna structure.

(c) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device, of a type approved by the Administrator, or an appropriate military service on military airports, the location and height of which is fixed by its functional purpose.

(d) Any construction or alteration for which notice is required by any other FAA regulation.

§77.17 Form and time of notice.

(a) Each person who is required to notify the Administrator under §77.13 (a) shall send one executed form set of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. Copies of FAA Form 7460-1 may be obtained from the headquarters of the Federal Aviation Administration and the regional offices.

(b) The notice required under §77.13 (a) (1) through (4) must be submitted at least 30 days before the earlier of the following dates—
(1) The date the proposed construction or alteration is to begin.
(2) The date an application for a construction permit is to be filed.
However, a notice relating to proposed construction or alteration that is subject to the licensing requirements of the Federal Communications Act may be sent to the FAA at the same time the application for construction is filed with the Federal Communications Commission, or at any time before that filing.

(c) A proposed structure or an alteration to an existing structure that exceeds 2,000 feet in height above the ground will be presumed to be a hazard to air navigation and to result in an inefficient utilization of airspace and the applicant has the burden of overcoming that presumption. Each notice submitted under the pertinent provisions of Part 77 proposing a structure in excess of 2,000 feet above ground, or an alteration that will make an existing structure exceed that height must contain a detailed showing directed to meeting this burden. Only in exceptional cases, where the FAA concludes that a clear and compelling showing has been made that it would not result in an inefficient utilization of the airspace and would not result in a hazard to air navigation, will a determination of no hazard be issued.

(d) In the case of an emergency involving essential public services, public health, or public safety, that requires immediate construction or alteration, the 30 day requirement in paragraph (b) of this section does not apply and the notice may be sent by telephone, telegraph, or other expeditious means, with an executed FAA Form 7460-1 submitted within five (5) days thereafter. Outside normal business hours, emergency notices by telephone or telegraph may be submitted to the nearest FAA Flight Service Station.

(e) Each person who is required to notify the Administrator by paragraph (b) or (c) of §77.13, or both, shall send an executed copy of FAA Form 7460-2, Notice of Actual Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area involved.

ADDRESSES OF THE REGIONAL OFFICES

Alaskan Region
AK

Alaskan Regional Office
Air Traffic Division, AAL-530
222 West 7th Avenue
Anchorage, AK 99513
Tel. 907-271-5893
Mailing Address:
Federal Aviation Administration
Alaskan Regional Office
Air Traffic Division, AAL-530
222 West 7th Avenue, Box 14
Anchorage, AK 99513-7587

Central Region
NE, IA, MO, KS

Central Regional Office
Air Traffic Division, ACE-530
601 East 12th Street
Kansas City, MO 64106
Tel. 816-426-3408

Eastern Region
NY, PA, WV, VA, DC, MD, DE, NJ

Eastern Regional Office
Air Traffic Division, AEA-530
JFK International Airport
Fitzgerald Federal Building
Jamaica, NY 11430
Tel. 718-553-1228
Fax: 718-553-1384

Great Lakes Region
ND, WI, MI, SD, IL, OH, MN, IN

Great Lakes Regional Office
Air Traffic Division, AGL-530
2300 East Devon Avenue
Des Plaines, IL 60018
Tel. 708-294-7568

New England Region
MA, NH, VT, RI, CT, ME

New England Regional Office
Air Traffic Division, ANE-530
12 New England Executive Park
Burlington, MA 01803-5299
Tel. 617-238-7538

Northwest Mountain Region
WA, OR, MT, ID, WY, UT, CO

Northwest Mountain Regional Office
Air Traffic Division, ANM-530
1601 Lind Avenue, SW
Renton, WA 98055-4056
Tel. 206-227-2530
Fax: 206-227-1530

Southern Region
KY, TN, NC, SC, GA, AL, MS, FL, VI, PR

Southern Regional Office
Air Traffic Division, ASO-530
1710 Columbia Avenue
College Park, GA 30337
Tel. 404-305-5585
Mail Address:
Federal Aviation Administration
Southern Regional Office
Air Traffic Division, ASO-530
P.O. Box 20636
Atlanta, GA 30320

Southwest Region
NM, TX, OK, AR, LA

Southwest Regional Office
Air Traffic Division, ASW-530
2601 Meacham Blvd.
Fort Worth, TX 76137-4298
Tel. 817-222-5531
Mail Address:
Department of Transporation
Federal Aviation Administration
Fort Worth, TX 76193-0530

Western Pacific Region
HI, CA, NV, AZ, GU

Western-Pacific Regional Office
Air Traffic Division, AWP-530
15000 Aviation Boulevard
Hawthorne, CA 90260
Tel. 310-297-1182
Mail Address:
AWP-530
P.O. Box 92007
Worldway Postal Center
Los Angeles, CA 90009

NSN: 0052-00-012-0007

7 CRITICAL PATH MEMORANDUM FOR PROJECT DEVELOPMENT

Form 000021 - WP
2-75

IOWA DEPARTMENT OF TRANSPORTATION

To Office Counties, City Representatives and Consultants Date August 1, 1997

From Larry Jesse

Office Local Systems

Subject Critical Path for Project Development **PLEASE POST**

Following are submittal dates to the Transportation Centers and the Office of Local Systems for lettings from January, 1998 through May, 1999. Preliminary and review submittals should be made simultaneously to the appropriate Transportation Center Local Systems Engineer and the Office of Local Systems. Proper submittals which don't involve right of way or environmental/historical issues and received by these dates will normally make the letting, but we encourage early submittals.

Critical Path Dates to Letting of Minor Type Projects*

Concept Statement (1)	Preliminary Plans (2)	Check Plans (3)	Final Plans (4)	Dev./ROW Certificate (5)	Letting Date
	08/18/97	09/29/97	10/20/97	11/03/97	01/13/98
08/04/97	09/15/97	10/27/97	11/17/97	12/01/97	02/13/98
09/22/97	10/27/97	12/08/97	12/29/97	01/12/98	03/24/98
10/27/97	12/01/97	01/12/98	02/02/98	02/16/98	04/28/98
12/01/97	01/05/98	02/16/98	03/09/98	03/23/98	06/02/98
01/12/98	02/16/98	03/30/98	04/20/98	05/04/98	07/14/98
02/16/98	03/23/98	05/04/98	05/25/98	06/08/98	08/18/98
03/23/98	04/27/98	06/08/98	06/29/98	07/13/98	09/22/98
04/27/98	06/01/98	07/13/98	08/03/98	08/17/98	10/27/98
06/01/98	07/06/98	08/17/98	09/07/98	09/21/98	12/01/98
07/13/98	08/17/98	09/28/98	10/19/98	11/02/97	01/12/99
08/17/98	09/21/98	11/02/98	11/23/98	12/07/98	02/16/99
09/21/98	10/26/98	12/07/98	12/28/98	01/11/99	03/23/99
10/26/98	11/30/98	01/11/99	02/01/99	02/15/99	04/27/99
11/23/98	12/28/98	02/08/99	03/01/99	03/15/99	05/28/99
(26wks)	(21 wks)	(15 wks)	(12 wks)	(10 wks)	

* Minor Type Project would be a project with: all the work within existing right of way(no land acquisition); no wet lands; no historical structures or districts; no federal-aid in consultant work; etc. Examples would include ACC resurfacing or bike trail surfacing on an existing railroad bed.

Critical Path Dates to Letting of Major Type Projects**

Concept Statement (1)	Preliminary Plans (2)	Check Plans (3)	Final Plans (4)	Dev./ROW Certificate (5)	Letting Date
		09/22/97	10/20/97	11/03/97	01/13/98
	08/04/97	10/20/97	11/17/97	12/01/97	02/13/98
	09/22/97	12/01/97	12/29/97	01/12/98	03/24/98
	10/27/97	01/05/98	02/02/98	02/16/98	04/28/98
	12/01/97	02/09/98	03/09/98	03/23/98	06/02/98
	01/12/98	03/23/98	04/20/98	05/04/98	07/14/98
08/18/97	02/16/98	04/27/98	05/25/98	06/08/98	08/18/98
09/22/97	03/23/98	06/01/98	06/29/98	07/13/98	09/22/98
10/27/97	04/27/98	07/06/98	08/03/98	08/17/98	10/27/98
12/01/97	06/01/98	08/10/98	09/07/98	09/21/98	12/01/98
01/12/98	07/13/98	09/21/98	10/19/98	11/02/98	01/12/99
02/16/98	08/17/98	10/26/98	11/23/98	12/07/98	02/16/99
03/23/98	09/21/98	11/30/98	12/28/98	01/11/99	03/23/99
04/27/98	10/26/98	01/04/99	02/01/99	02/15/99	04/27/99
05/25/98	11/23/98	02/01/99	03/01/99	03/15/99	05/28/99
(52wks)	(26wks)	(16 wks)	(12 wks)	(10 wks)	

** Major Type Project might be a project with: possible wetlands; 4f land; railroad crossing; historical structure; right of way (land acquisition or easements) needed; federal-aid for consultant work (PE) or right of way; etc. Examples would include relocating a road on new alignment, a major bridge, or a historical structure.

OVER ➤

1) The Concept includes Project Concept Statement, Location map, and applicable environmental documents. Four (4) completed copies are to be submitted to the Transportation Center Local Systems Engineer (TC) as soon as possible. If undisturbed land is involved, the local agency should have previously requested archaeological / historical reviews. 404 regulations require early review of any project involving earthwork with your NRCS Office.

2) One copy of the preliminary plans is to be submitted to the TC and two copies to the Office of Local Systems. A structure project requires four (4) sets of prints, one (1) submitted to the TC and three (3) submitted to the Office of Local Systems along with one (1) copy of the T.S.& L. information. Preliminary plans should identify right of way needs, if any

3) "Check" plans can be either full size (22" x 34") or half size (11" x 17") prints. Check plans should include all proposed bid items (with item codes), estimate reference notes, and draft special provisions (if needed). Include a 3/12 disk copy of the special provisions (WordPerfect 6.1 preferred). Bridge and box culvert projects require four (4) sets of prints, three (3) submitted to the Office of Local Systems (non-standard bridges need design calculations) and one (1) to TC. All other projects require three (3) sets of prints, two (2) to the Office of Local Systems and one (1) to the TC. Include the required 404 and Iowa DNR Permit numbers (if applicable), and FHWA structure number on the title sheet.

4) Final letting plans (with a copy of Check Plan comments) and one print of the plans are to be submitted to the Office of Local Systems including a copy of the detailed estimate. Final letting plans to Local Systems need to have signatures on the title page. Final letting plans can be either full or half size on either vellum, mylar, or paper. 11" x 17" white paper with black readable printing is requested. Borders should be 5/8" on ends and 5/16" on top and bottom.

5) Project Development Certification is due a minimum of 10 weeks prior to letting. Plans will normally not be submitted to the Office of Contracts without the certificate. Any delay in certificate submittal can cause the plans to be held until the next letting.

8 GUIDELINES FOR DESIGN AND DEVELOPMENT OF PRELIMINARY PLANS

November 1997

GUIDELINES FOR DESIGN AND DEVELOPMENT OF LOCAL PUBLIC AGENCY (LPA) PRELIMINARY PLANS

FEDERAL-AID PROJECTS
ROADS-BRIDGES-ENHANCEMENTS

Preliminary plans are to be simultaneously submitted to the Iowa DOT Transportation Center Local Systems Engineer (TC) and the Office of Local Systems (LS). Please see the Office of Local System's "Critical Path For Project Development" memo for dates and numbers of copies.

Note: If the designer is not familiar with the format to use for federal-aid projects to be let to bids through the Office of Contracts, please contact the TC for sample plan.

PRINT AND LETTERING SIZE: Should be large enough to be easily read when reduced to 11" x 17" for letting plans. Plan sheets will not be larger than 22 x 34 inches. (same size for metric plans)

TITLE SHEET: (Stamp each copy "preliminary") including:

Location Map - Street Names and Project Limits.
Signature Blocks:
Engineer's Certification Block.
LPA Block - Approved and Title.
Iowa DOT Block - Accepted for Letting and Urban Systems Engineer or Secondary Roads Engineer
Index of Sheets.
Project Number.
LPA and Project Names.
Mileage Summary Tabulations.
Tabulations for Standard Road Plans and/or Standard Bridge Plans
Tabulation of Design Traffic Volumes (if available) With Design Speed

PRELIMINARY PROJECT PLANS AND SUBMITTAL SHOULD COVER THE FOLLOWING ITEMS AND EXPLANATIONS: (Flow chart 6P)

- Typical Cross Section: All design features within right of way. Recommend use of Iowa DOT Office of Design Aids (Green) Manual Section 2000. Dimensions and slopes are required.

- Preliminary right of way acquisition lines. (If concept statement indicated no additional right of way or easement, but is now needed, contact TC immediately). Especially on grading projects need lines (construction limits) should be shown.

- Existing Right of Way lines.

- Horizontal Clearance (give dimensions), or list locations and dimensions in the cover letter addressed to the TC. (compare to the design elements table in the concept statement)
- Storm sewer layout with intakes and utility access (manhole) locations noted. Location and size of roadway and entrance pipe culverts.
- Profile Grades and Vertical Curve Data (include grade %, lengths, K Factor and design speed).
- Horizontal Curve Data (give super elevation %, degree of curve, curve length, and design speed).
- Intersection with Traffic Control Signals scale should be 1" = 20' (or equal) drawings with pavement markings for through and turning lanes (lane lines), stop bars, cross walks, poles and mast arms with signal head locations, sidewalk locations, pedestrian curb ramp locations and detection loops.
- Railroad Crossing with property lines. Indicate name of company and crossing controls (cross bucks, signals etc.).
- Geometric detail drawings for major road and street intersections. (include channelization, radii, taper ratio and lengths, use 1" = 20' or equal scale dimensions for drawings).
- Detail Drawings as needed to support preliminary design. Suggest use of applicable details from sections 1000 to 9000 from the Iowa DOT Office of Design "Design Aids" (Green) Manual. These Design Aids details need to be copied into the plans and dimensioned (not listed like the Standard Road Plans).
- For Structure Type, Size and Location (TS&L)Plans need to refer to IM 3.131 ("Design and Submittal of Preliminary Bridge and Culvert Plans.")
- Use Project Concept Statement that was accepted by the Iowa Transportation Center Local Systems Engineer (TC) to design project elements.
- Include letter to TC if concept design criteria doesn't meet the Design Aids or if design exceptions are needed. Please refer to Index #4.
- The AASHTO "Guide for the Development of Bicycle Facilities" will apply to bicycle paths and lanes. Design features less than the minimums outlined in chapter 2 need to be justified by a letter to the TC.
- If Special Backfill or Granular Subbase is proposed, design should include an under drainage system, Road Standards RF-19C and RA-38 are recommended.
- It would be helpful to submit a preliminary cost estimate with the preliminary plans.
- If project is within 20,000 feet of airport check IM3.15.

9 FINAL PLANS GUIDELINES

November 1997

FINAL PLAN GUIDELINES FOR LOCAL PUBLIC AGENCY (LPA)

FEDERAL-AID PROJECTS ROADS-BRIDGES-ENHANCEMENTS

Check Plans (Flow Chart No. 12P): Plans and Special Provisions (SP) with 3 1/2" disk are to be submitted simultaneously to the Iowa DOT Transportation Center Local Systems Engineer (TC) and the Office of Local Systems (LS). Please see the Office of Local System's memo "Critical Path For Project Development" for dates and number of copies. Bridge or large drainage structures will follow the steps outlined in the LS memo "Review Procedure for County and City Bridge Plans."

Check Plans need to incorporate the preliminary plan review comments provided by the TC, Office of Bridges and Structures and other offices. The applicable items found in the "Guidelines For Design and Development of Preliminary Plans" should be reviewed for additions to these plans if not already incorporated.

Final Plans (originals): Flow Chart 13P: Plans, Special Provisions and the itemized cost estimate are to be submitted to LS by the final plan turn-in date. Also, be aware of the need to submit the Project Development Certification form at least 10 weeks prior to the target letting date. Late submittal of the certification form may cause a delay in the letting date.

Signatures: LPA official and their design engineer signatures need to be on the final plan title sheet prior to submitting the final plans to LS for letting.

CHECK PLANS, FINAL PLANS, AND SPECIAL PROVISIONS (SP) SHOULD TAKE INTO ACCOUNT THE FOLLOWING ITEMS:

- Title Sheet: Referenced Iowa DOT Standards (Red Manual) should show the current revision date. Bridge and drainage structure plans should include the applicable Army Corps of Engineers (COE) permit number and Iowa Department of Natural Resources permit number. Grading plans also require COE permit number. Plan title sheet should have a "work type" identified that references the type or types of work involved in the project.

- Show typical cross section for each major pavement section. Include all design features within the right of way. Use stationing to identify where each typical is applicable. Typical cross section drawing from the Road Design Details (Green) Manual should be used wherever possible.

- Show typical intersection jointing and geometric details. Major intersections may require separate detail sheets. (Use Road Standards RH-50's to identify joints) Designers should consider whether intersection corner radii are adequate.

- Iowa DOT Standards, Supplemental Specifications (SS), and Standard Bid Items should be used unless:
  1) An item is not covered by the Iowa DOT specifications, or
  2) The contracting authority can justify that a particular item is necessary, ie to maintain system compatibility.

  The use of proprietary brand names for specific materials is not allowable, unless justified in writing on Federal-aid projects. Written justification is to be provided to the TC and LS prior to use in the plans.

- Estimated Project Quantities tabulation and list of Estimate Reference Information should follow the Iowa DOT Office of Contracts "Bid Item Description" book. Each item will use the BIAS/BAMS code. Each quantity item coded 2599-9999xxx will need a SP or reference note for the method of measurement and basis of payment and details of construction. The estimate reference information notes should explain the items, refer to a supplemental tabulation, refer to a detail plans sheet, or refer to a Special Provision. If the Bid Items booklet MEAS/PAY column has "PLAN, STD6, OR SP2," see special instructions in the front of the booklet, which also requires plan notes pertaining to the method of measurement and basis of payment.

- LPA Standards should be included as separate sheets. These usually require a special quantity item code (2599 series) and SP.

- Traffic Control notes and/or plans are required. Proposed construction staging requires inclusion of details and plan notes. Quantity items may be needed for flaggers and safety closures. Recommend use of the "RS" series Standard Road Plans. The opening line should state if traffic is to be maintained or detoured.

- Plan notes deleting parts of an Iowa DOT Specification are generally not permitted. If there are special problems, please contact the TC or LS.

- Standard Notations (200 series) from the Road Design Details (Green) manual are recommended for uniformity. These may save time in writing general plan notes.

- Estimate reference information notes should be brief and refer to a sheet number, tabulations, or explain anything special. Do <u>not</u> use estimate reference information notes to cite the applicable sections in the specification book. The standard item codes directs the bidder or inspector to that section. General project information should not be in the estimate reference notes nor should estimate reference information be in the general notes.

- Incidental material or work is to be kept to a minimum. Estimated quantity items need to be used for all measurable work and materials. If an item value is less than $500 it may be appropriate to list as incidental.

- Class 10, 12, or 13 Excavation (or other class) quantities need to have a separate tabulation, pay item, or other plan notes (cut, fill, shrinkage %, waste, borrow, topsoil, etc.). Roadway pipe culverts may require bid item for "Class 20 Excavation, for Roadway Pipe."

- "Earth Shoulder Finishing, Stations" bid item is needed to pay for finishing the fill behind the curb line, along edge of paved trail, or edge of pavement. Be sure that each side is measured separately. Remember finishing does not pay for the dirt.

- Close attention to the notes on the bridge approach guardrail "RE" Standard Road Plans will assist in determining all required quantity items.

- Some bid items listed in the main "tabulation of estimated quantities" should be supplemented by individual tabulations from section "100" series of the Road Design (Green) manual.

- New and existing right-of-way lines including temporary construction easements should be drawn and identified on each plan and profile sheet. The "area clearing and grubbing" quantity item can be described by these lines.

- Pavement smoothness and certified plant inspection requirements need to be noted in the plans if these are applicable (Iowa DOT Specifications sections 2316 and 2521). Certified plant inspection requires the bid item "Field Lab."

- Plan references to specific Iowa DOT Supplemental Specifications should be by title name (not SS-number).

- On city projects, the project engineer is expected to provide to the City Clerk/Administrator information supplied from the Iowa DOT Office of Contracts concerning the bidding proposal, notice to bidders information, and tabulation of bids. These will need to be used for the required city council public hearing on the plans, specifications and estimate of costs.

- Enhancement Project: If using Portland Cement Concrete (PCC) for a trail, pedestrian walk, or bike path, the Iowa DOT Specification Section 2511 Removal and Construction of Portland Cement Concrete Sidewalks should be used. Asphalt surfacing should be in accordance with Section 2303 Asphalt Cement Concrete Mixtures.

- Lettering size should be large enough and easily readable after plan reduction to 11" x 17".

The above listed items are not intended to cover all of the details and notes that normally are found in final plans. The listed items address subjects where most questions or problems generally arise.

10 FEDERAL-AID PROJECT DEVELOPMENT CERTIFICATION FORM

Form 730002
3-97

Iowa Department of Transportation

PROJECT DEVELOPMENT CERTIFICATION

City _____ Project Number _____

County _____

1. **RAILROADS:** Is there a railroad crossing or railroad property affected by the proposed project? ☐ Yes ☐ No
   If yes, what is the status of agreement(s)?

2. **UTILITIES:** Are utility companies affected by the proposed project? ☐ Yes ☐ No
   If yes, franchise and agreement status, or official notice given?

3. **PRIMARY HIGHWAY:** Will state right of way or access to state right of way be affected? ☐ Yes ☐ No
   If yes, permit status?

4. RIGHT OF WAY

   a. Was additional right-of-way (permanent or temporary easements, fee title) required for this project? ☐ Yes ☐ No If no, skip the rest of this form.

   b. Permanent right-of-way and/or access rights for _____ parcels for the construction of the project have been acquired, except the _____ parcels listed on the reverse side.

      When all exceptions have been cleared, a written notification stating same shall be submitted, at least 10 days prior to project letting date.

   c. Temporary construction easements for _____ parcels have been acquired, except the _____ parcels listed on the reverse side.

      When all exceptions have been cleared, a written notification stating same shall be submitted, at least 10 days prior to project letting date.

5. RELOCATION

   a. Will any persons or businesses be displaced by this project? ☐ Yes ☐ No

   b. If yes, all eligible relocatees, _____ residential and _____ businesses, except those _____ listed on the reverse side have obtained and relocated into replacement housing and business locations. An inspection of the project was made on site. Decent, Safe, and Sanitary housing has been offered and is available to residential relocatees. Barring unforeseen circumstances beyond our control, the listed occupants will relocate by the date and manner indicated.

This certification assures compliance with all applicable Federal and State laws, rules and policies and a copy must be filed with the Office of Local Systems 10 weeks prior to letting.

DATED _____ TITLE _____

SIGNATURE _____ COUNTY/CITY _____

FOR IOWA DOT USE

REVIEWED BY _____ TITLE _____

DATED _____

SIGNATURE _____

EXCEPTION STATUS

RIGHT OF WAY ACQUISITION EXCEPTIONS:

Parcel	Sta. to Sta.	Side	CONDEMNATION Date of Condemnation Hearing *(must be two weeks prior to letting)*	Date Warrant Will Be Deposited & Physical Possession Will Occur

RELOCATEE EXCEPTIONS:

Parcel	Name	Owner or Tenant	Sta. to Sta.	Side	Vacation Date Per Notice

11 SAMPLE FORM OF NOTICE OF SUBSCRIPTION RENEWALS DUE AND MANUALS AVAILABLE

Note: **This form is included as an example only. It should not be reproduced for use.**

Please contact the Iowa DOT'S Accounting Section at 515-239-1588 to obtain the most current form for your use.

Form 160001
11-96

Iowa Department of Transportation

Notice of Subscription Renewals Due And Manuals Available

Calendar Year 1997

SEND TO:
Iowa Department of Transportation
Office of Accounting
Attn: Cashier
800 Lincoln Way
Ames, Iowa 50010

Subscribers should mark the appropriate boxes for the subscriptions and manuals desired.

ITEM		QTY.	COST EACH	TOTAL COST
Manuals	**(Stock #)**			
1992 Spec Book **(English)**	(306500)		$ 9.00	
1995 Spec Book **(Metric)**	(306525)		10.00	
Brown Road Design Manual **and** 1997 revisions†	(302800)		16.00	
Green Road Design Details **and** 1997 revisions† (Includes 1 English & 1 Metric Version)	(302805)		15.00	
Red Standard Road Plans--**and** 1997 revisions† (Includes 1 English & 1 Metric Version)	(302810)		30.00	
Construction Manual--and 1997 revisions†	(302750)		29.00	
Materials IM's Volume I (General Info., Sampling & Testing)--**and** 1997 revisions†	(302760)		18.00	
Materials IM's Volume II (PCC, AC & Field Sampling & Testing)--**and** 1997 revisions†	(302770)		30.00	
Materials IM's Volume III (Shop & Field Welding and Painting)--**and** 1997 revisions†	(302780)		12.00	
Materials IM's Volume IV (Aggregate Certification & T-203)--**and** 1997 revisions†	(302790)		10.00	
1997 Manual Revisions Only *(Orders Not Accepted After 1-31-97)*				
Red Standard Road Plans--1997 revisions **only** *(English & Metric)*			$13.00	
Green Road Design Details--1997 revisions **only** *(English & Metric)*			8.00	
Brown Road Design Manual--1997 revisions **only**			8.00	
Materials IM's Volume I (General Info., Sampling & Testing)--1997 revisions **only**			9.00	
Materials IM's Volume II (PCC, AC & Field Sampling & Testing)--1997 revisions **only**			15.00	
Materials IM's Volume III (Shop & Field Welding and Painting)--1997 revisions **only**			6.00	
Materials IM's Volume IV (Aggregate Certification & T-203)--1997 revisions **only**			6.00	
Construction Manual--1997 revisions only			12.00	
1997 Annual Subscriptions				
Weekly Letting Report--calendar year subscription			$65.00	
Detour & Embargo Map--biweekly March through December			4.00	
Tabulations of Highway Bids--calendar year subscriptions **All types--Construction Work** *(excluding maintenance and bridge painting)*			$90.00	
Structures only--Includes Bridge and Culverts			48.00	
Paving only--Includes PCC, Reconstruction and ACC			45.00	
Grading only			18.00	
Miscellaneous only--Includes Surfacing and Other Types of Work			25.00	
Maintenance work and **Bridge Painting** only			45.00	

†Without binder.

*All non-governmental agencies or individuals residing within the State of Iowa are required to pay 6% sales tax *(which includes 1% Local Option Sales Tax.)*

Total

Sales Tax*

Total Remittance Payable to Iowa DOT

MAIL TO: Name _____ Phone Number _____

Street Address or P.O. Box No. _____

City _____ State _____ Zip Code _____

Please allow a minimum of 45 days for receipt of shipment. Present subscribers must renew their subscriptions by December 31, 1996, or be dropped from the mailing lists on that date. If you have already renewed your subscription(s) for 1997, please disregard this request.

Inquiries should be made to the Accounting Office 515/239-1588.

White Copy - Accounting; Yellow Copy - Plans Distribution; Pink Copy - Office Supplies; Goldenrod Copy - Subscriber.