DEPARTMENT OF THE ARMY
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

REPLY TO
ATTENTION OF

July 27, 2010

Flood Protection and Navigation Section

Mr. Jay Punia, Executive Officer
Central Valley Flood Protection Board
3310 El Camino Ave., Room LL151
Sacramento, CA 95821

Dear Mr. Punia:

As you are aware, the State of California is responsible for inspecting the projects sponsored by the Central Valley Flood Protection Board. The Sacramento District, U.S. Army Corps of Engineers (Corps) is responsible for inspecting all other projects within the District boundaries. In an effort to ensure consistency in our inspections, the Sacramento District developed an inspection flow chart. The Department of Water Resources worked with the Sacramento District to clarify the Corps checklist in creating the inspection flow chart.

Title 33 Section 208.10 requires that the Superintendent, in this case the Central Valley Flood Protection Board, shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. To ensure the serviceability of the flood damage reduction projects current Corps criteria requires the use of the Corps checklist (encl 1) to determine PL 84-99 eligibility. This checklist was revised and conveyed to the State in 2007 to reflect current engineering standards.

When the State is preparing their annual reports, the Corps requests the use of this checklist to ensure consistency within the organizations. To further promote consistency among inspections, the Sacramento District has developed the attached flow chart which serves as the Sacramento District's Policy as to how the checklist will be implemented within this district (encl 2). The intention of the flow chart is to aid Sacramento District inspectors, DWR inspectors and contractors to rate levee segments which are part of the Rehabilitation and Inspection Program in a consistent manner which meets the standards defined by the Corps checklist. The tool quantifies the items in the checklist and is intended to improve consistency among inspectors. The Sacramento District requests the State begin using this flow chart during their fall 2010 inspections. We encourage you to work with the local maintaining agencies to ensure these standards are clear. We will work with you to refine the flow chart for the fall 2011 inspections. Sacramento District expects the State will be fully utilizing these standards by fall 2011. Once both agencies are utilizing this flow chart consistently, local

maintaining agencies will better understand the standards by which they will be rated. Our collaboration on this effort will ultimately result in consistent ratings and improved maintenance.

Thank you for your cooperation in this effort. If you have any questions or concerns, our point of contact is Ms. Rachael Hersh-Burdick (916-557-7009) or Mr. Ryan Larson (916-557-7568).

A copy of this letter is being furnished to Mr. John Paasch, Acting Chief Flood Project Integrity and Inspection Branch, 3310 El Camino Avenue, Suite LL30, Sacramento, CA, 95821.

Sincerely,

Michael D. Mahoney, P.E.
Levee Safety Officer
Chief, Construction-Operations Division

Sacramento District
Flood Damage Reduction Segment
Inspection Flow Chart

This flow chart was created by the Flood Protection and Navigation Section of the U.S. Army Corps of Engineers (USACE) Sacramento District (SPK) in consultation with the Geotechnical Engineering Branch (SPK). The Department of Water Resources also worked with the Flood Project and Navigation Section to clarify the checklist in creating the inspection flow chart. The intention is to aid USACE inspectors, Department of Water Resource inspectors and contractors to rate levee segments which are a part of the Rehabilitation and Inspection Program in a consistent manner which meets the standards defined by the USACE checklist. This flow chart quantifies the items in the checklist and is intended to improve consistency among inspectors, but it is not intended replace common sense, engineering judgment or the wording used in the checklist.

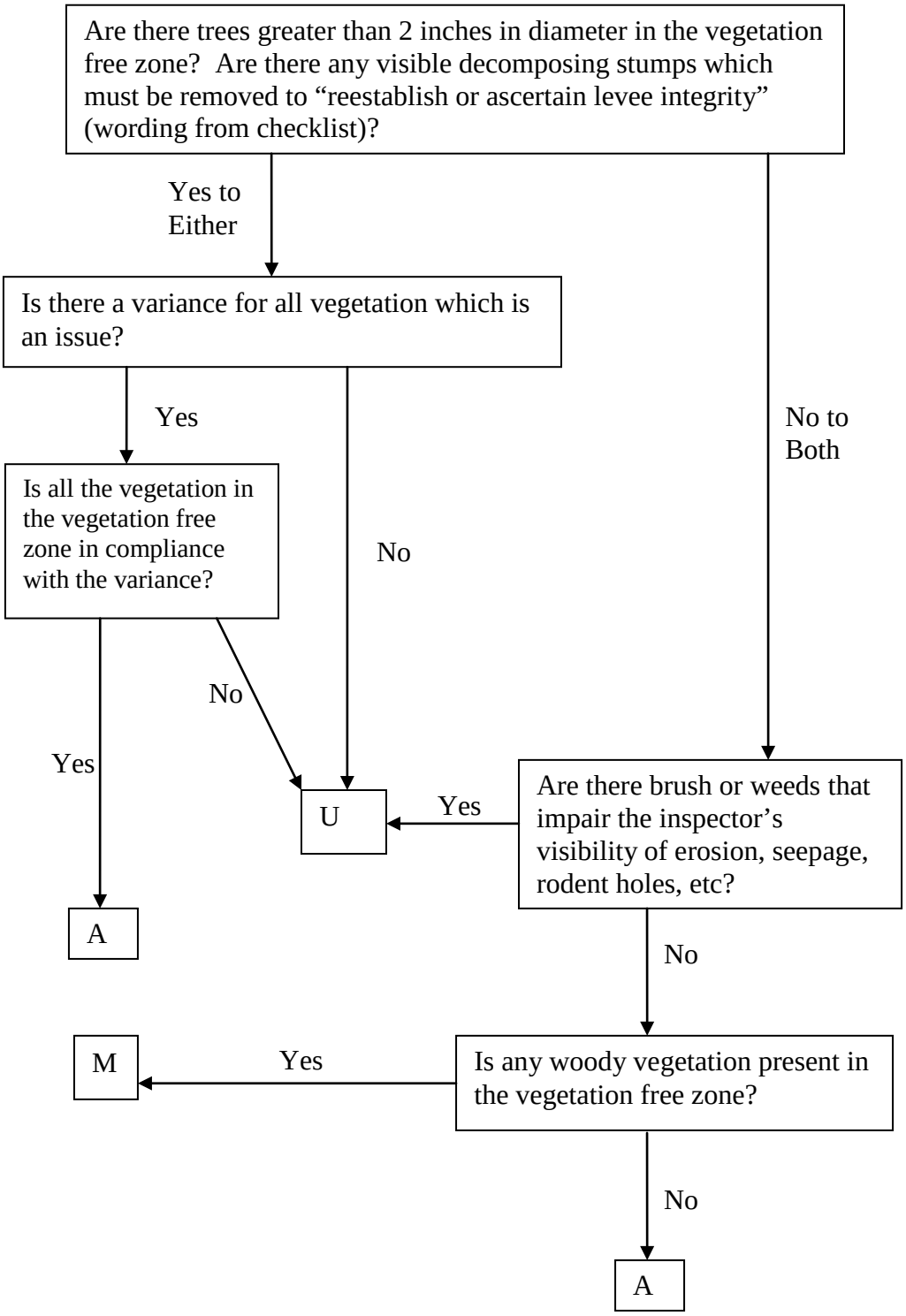
In the future the flow chart can serve as a more accessible way to explain to the local maintainers of the project exactly what they need to do to get the desired rating on a given item.

It is the responsibility of the sponsor to provide a map of the easement area, without such a map, or reasonable justification, it will be assumed that the easement area extends 15 ft from the landside levee toe.

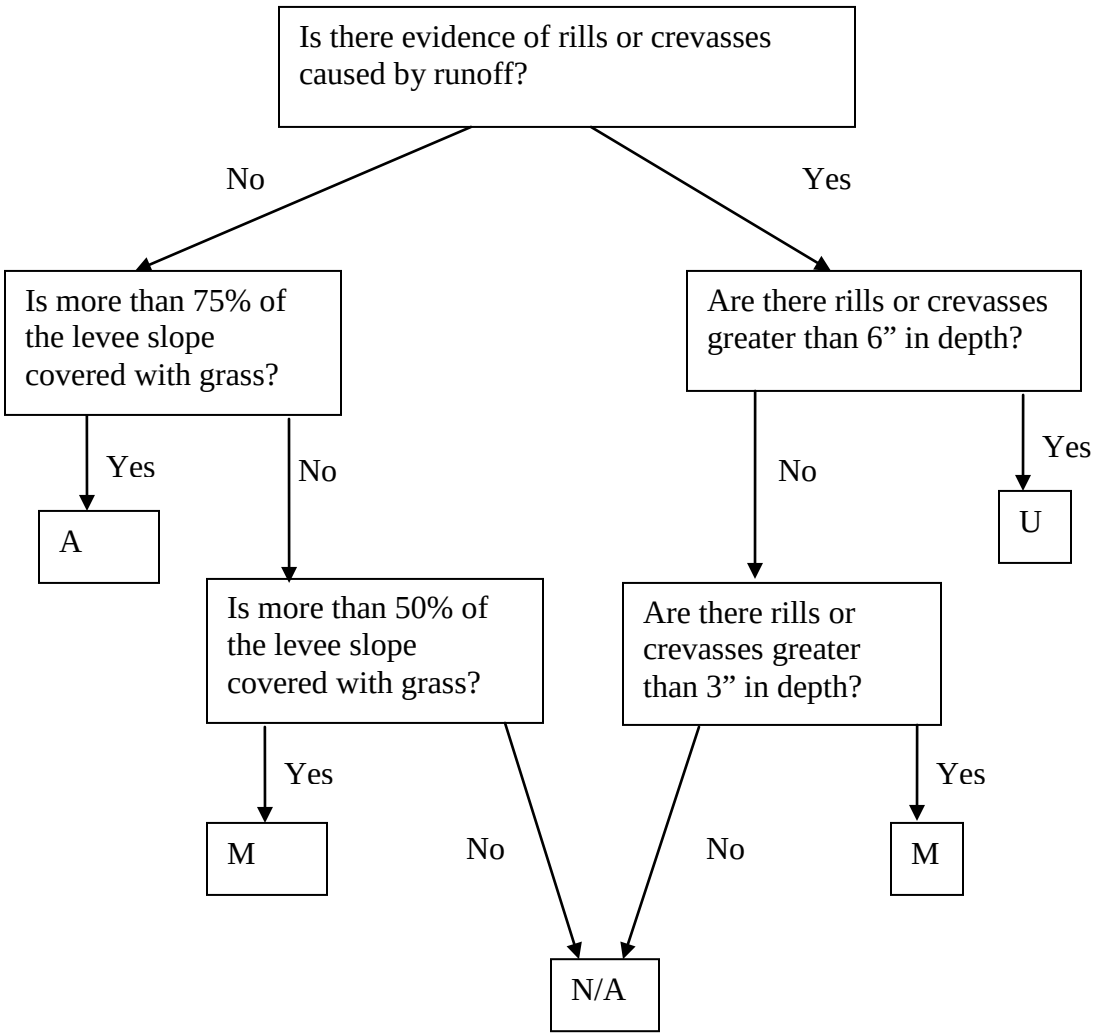
While the California's Central Valley Flood System Improvement Framework (Framework) is in effect, Central Valley Flood Protection Board (CVFPB) sponsored projects will be evaluated using Framework Criteria to determine whether a project is active or inactive. All other projects must receive acceptable or minimally acceptable system ratings to remain active in the PL 84-99 rehabilitation program.

1. Unwanted Vegetation Growth

The vegetation free zone is described in the USACE checklist as an area which "extends 15 feet from both the landside and riverside levee toes to the centerline of the tree. If the levee access easement doesn't extend to the described limits, then the vegetation free zone must be maintained to the easement limits." Reference ETL 1110-2-571 (http://140.194.76.129/publications/index.html) for more details.

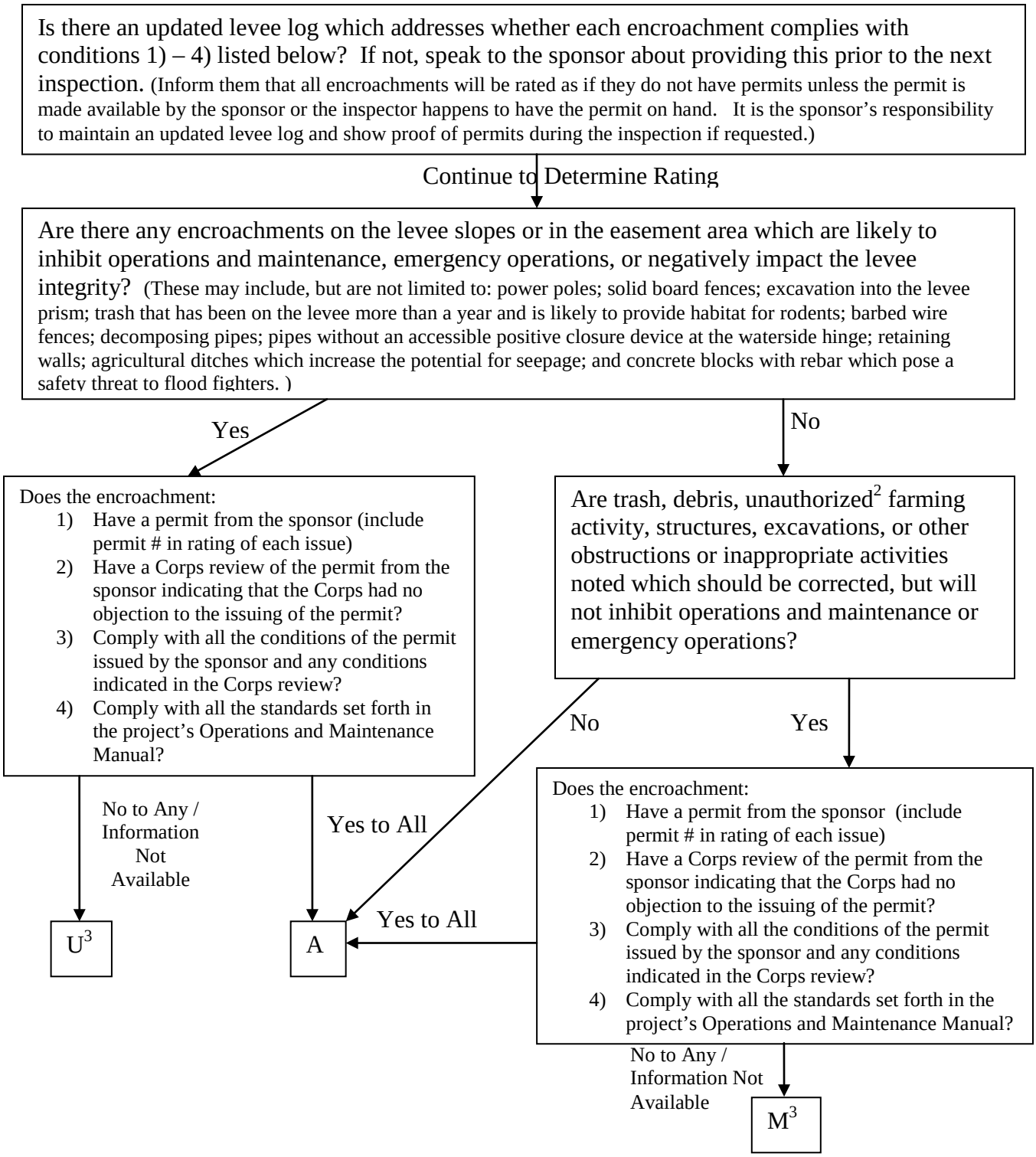


2. Sod Cover[1]



[1] “Sod Cover” for the purposes of CA refers to the surface protection of the levee slopes to protect against erosion. This includes rating the levee for erosion caused by surface runoff.

3. Encroachments[1]

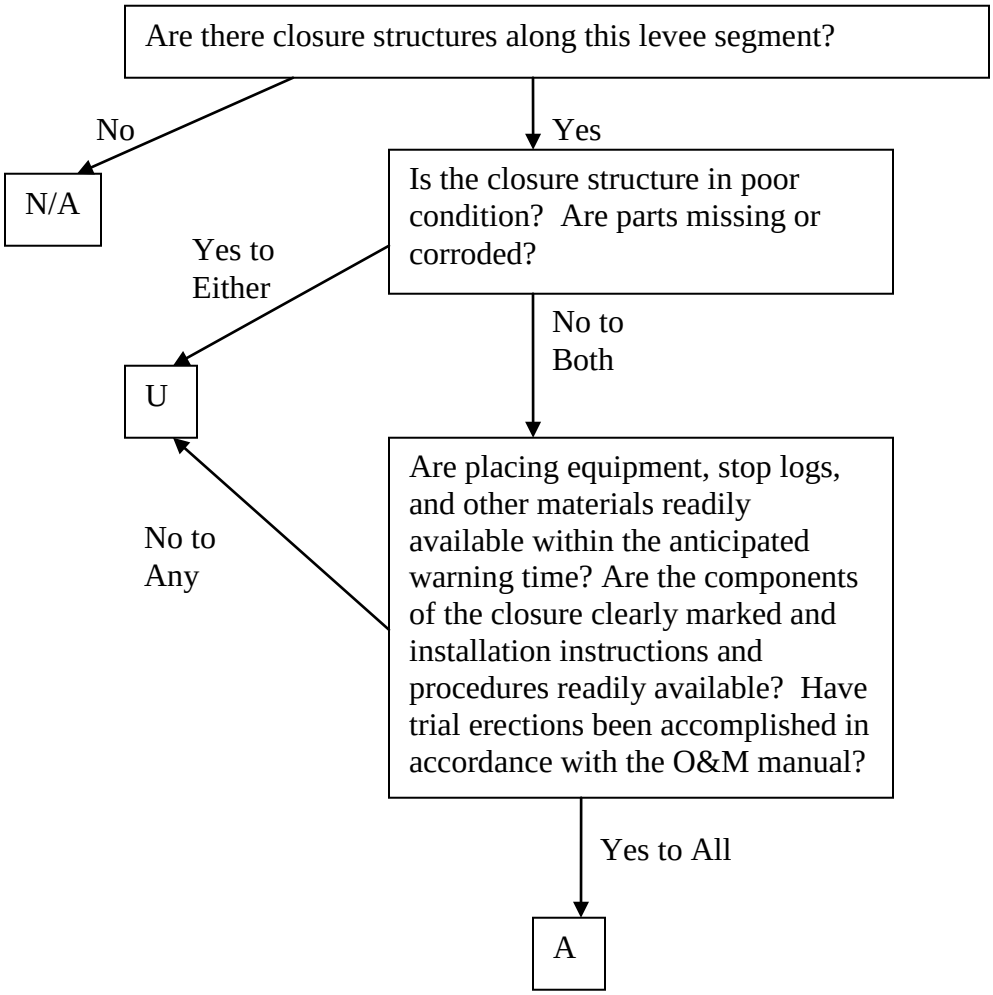


[1] If the encroachment in question is a pipe (pipes passing through the levee or running parallel to the levee toe in the easement area that are not a part of the federal project) then use this flow chart and the flow chart for item 11, but record the rating under item 3, the issue rating will be the lower of the two ratings.

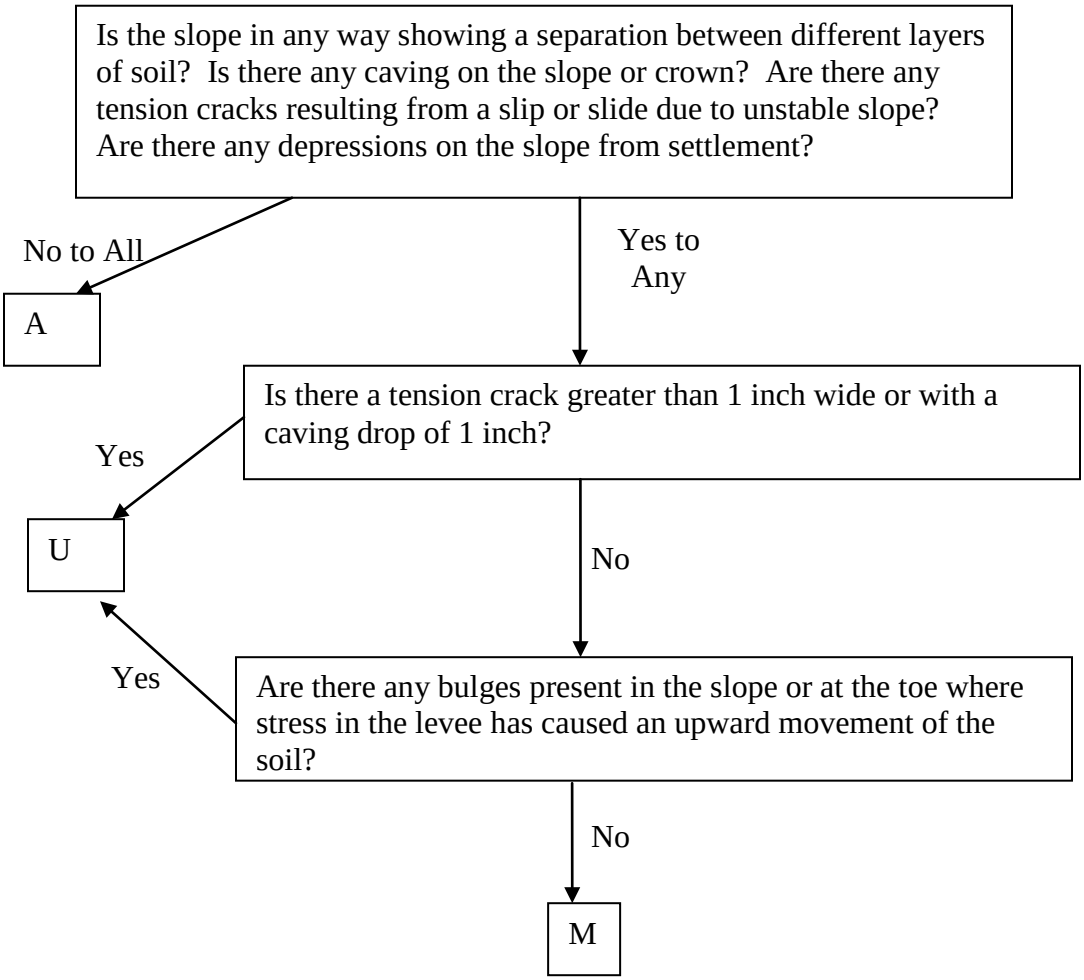
[2] Unauthorized - farming activity, structures, excavations, or other activities occurring on the levee crown, slopes, within 15' of the levee toe or to the edge of the levee easement, whichever is smaller, that do not have a permit from the sponsor that has been/would be approved by the Corps of Engineers.

[3] The encroachment must comply with conditions 1) - 4) or be removed (Currently minimally acceptable encroachments risk receiving an unacceptable rating during a future inspection if a permit is not available on future inspections).

4. Closure Structures



5. Slope Stability



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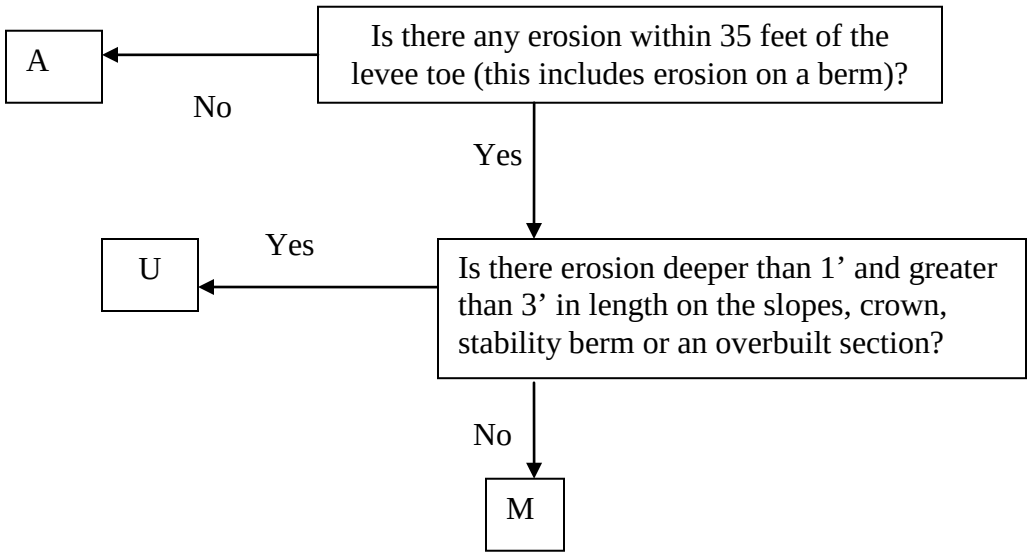
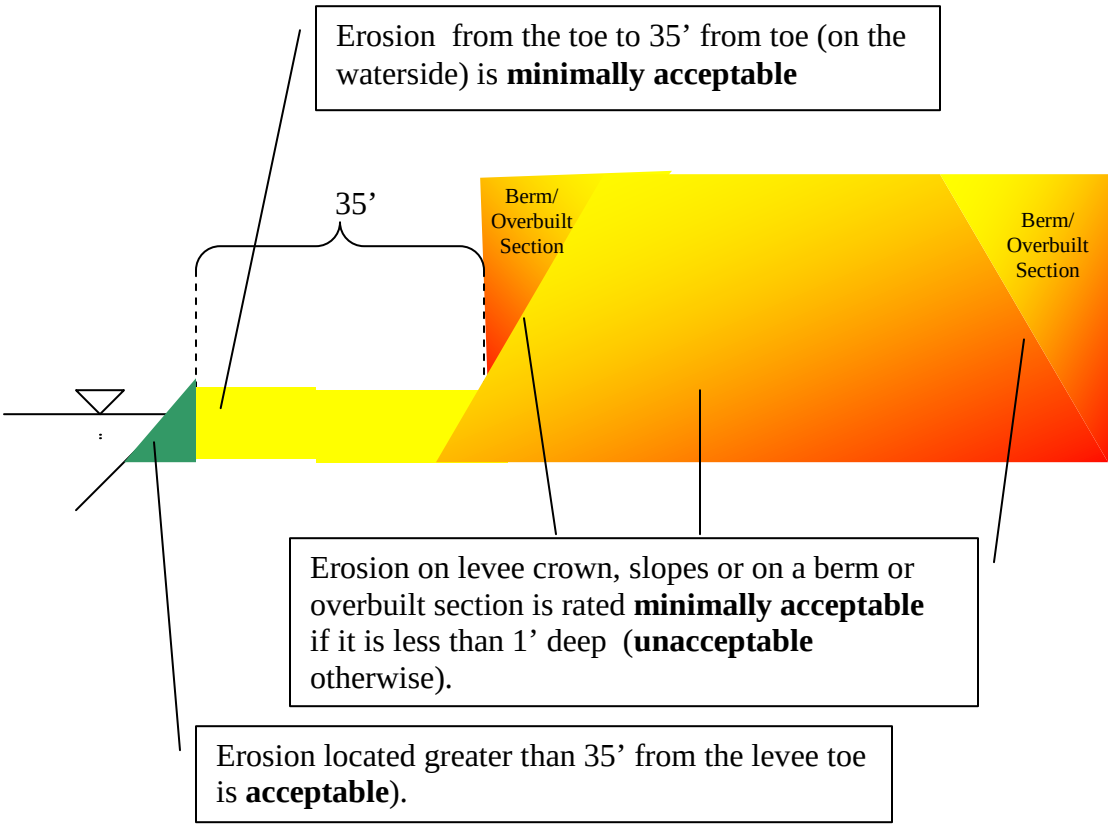
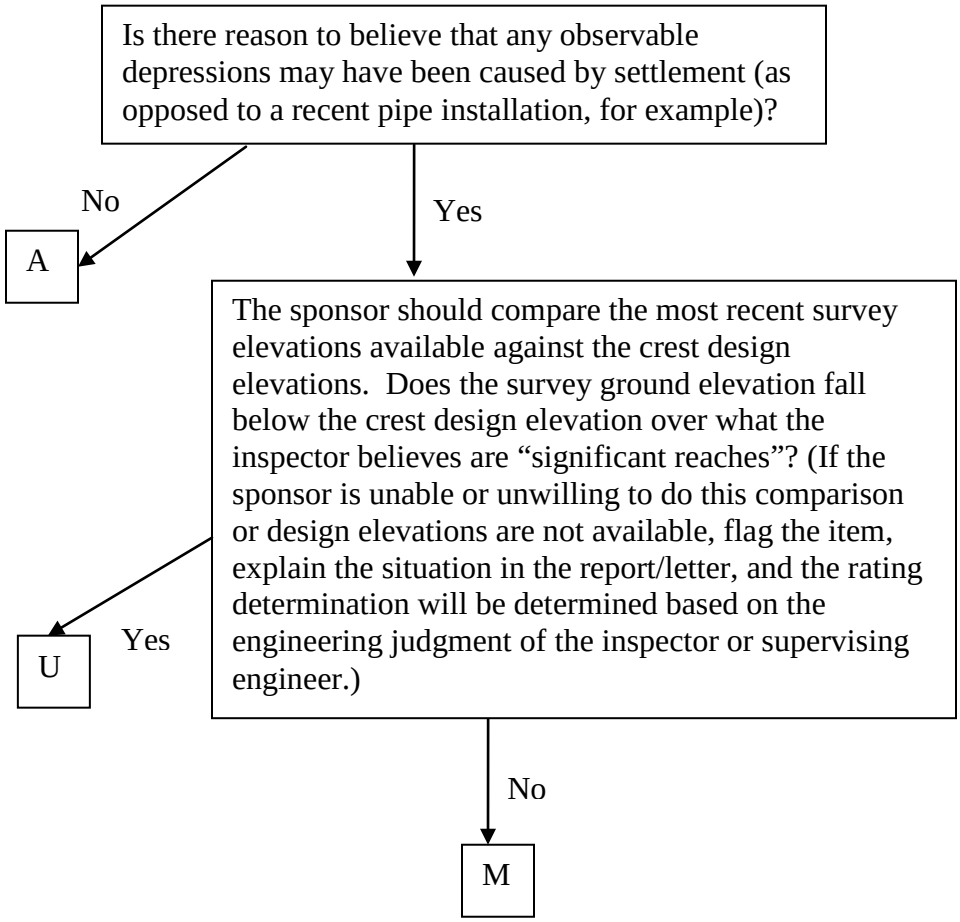
6. Erosion/Bank Caving [1]



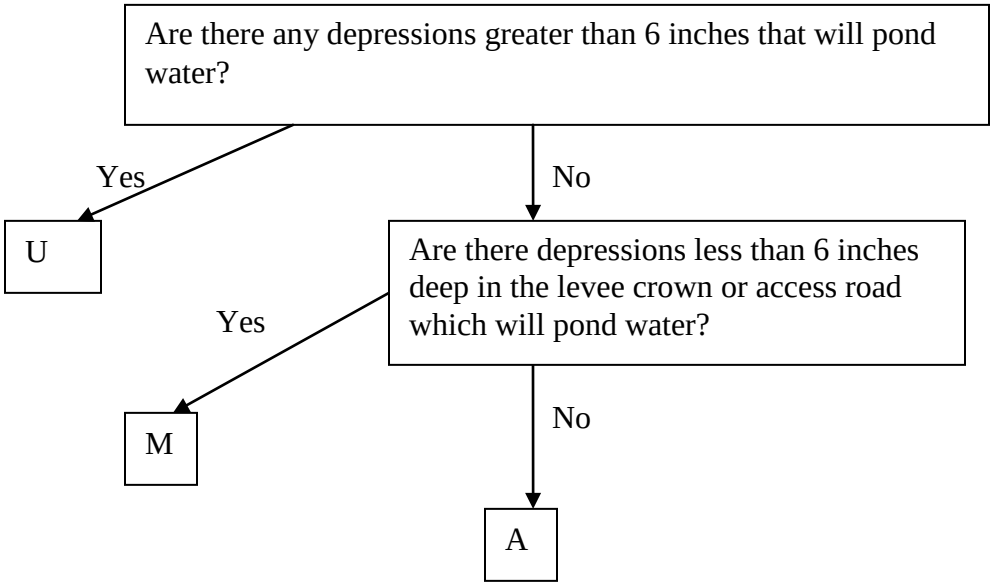


[1] Note that erosion from surface runoff is recorded under item 2."Sod Cover"

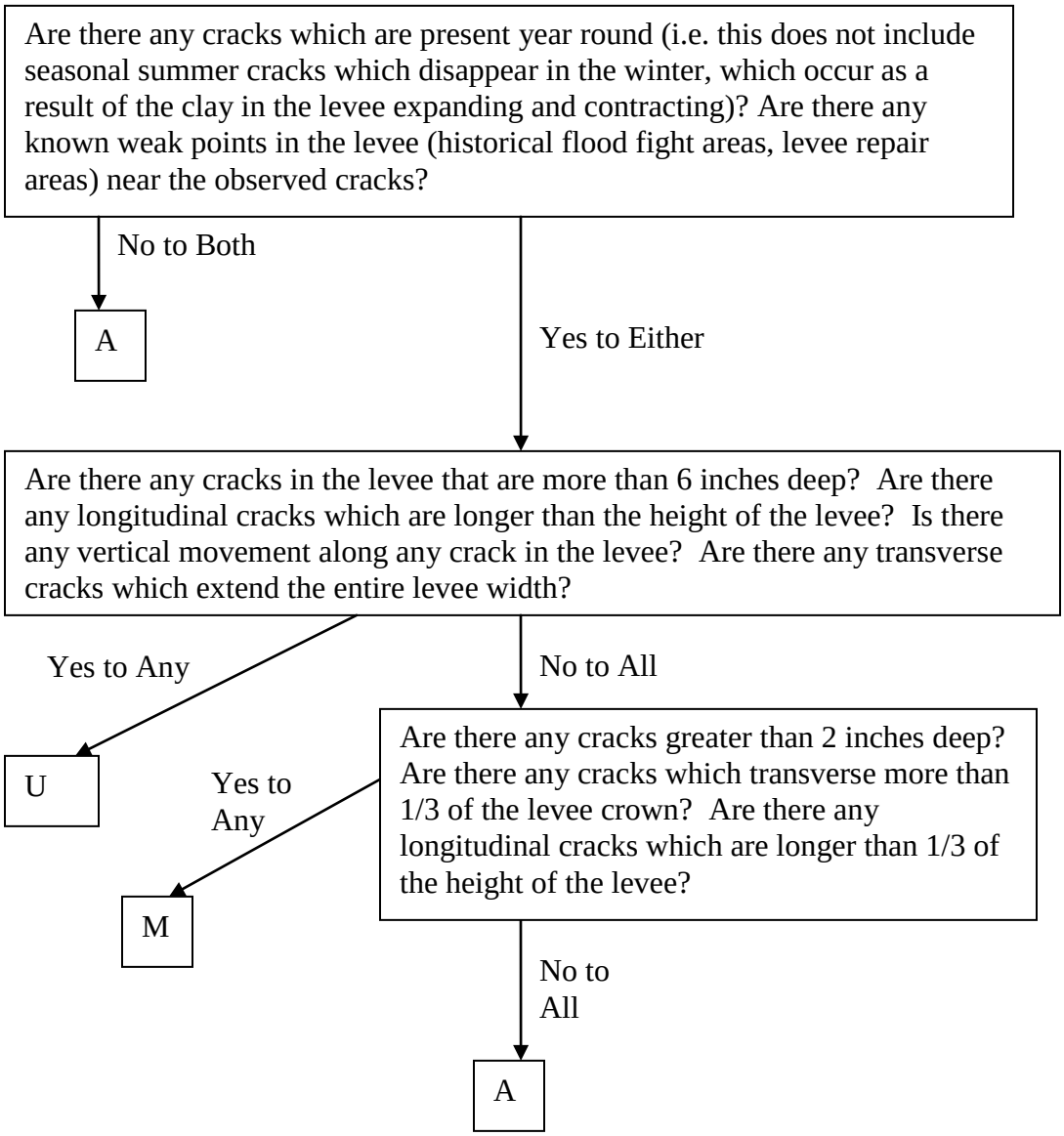
7. Settlement



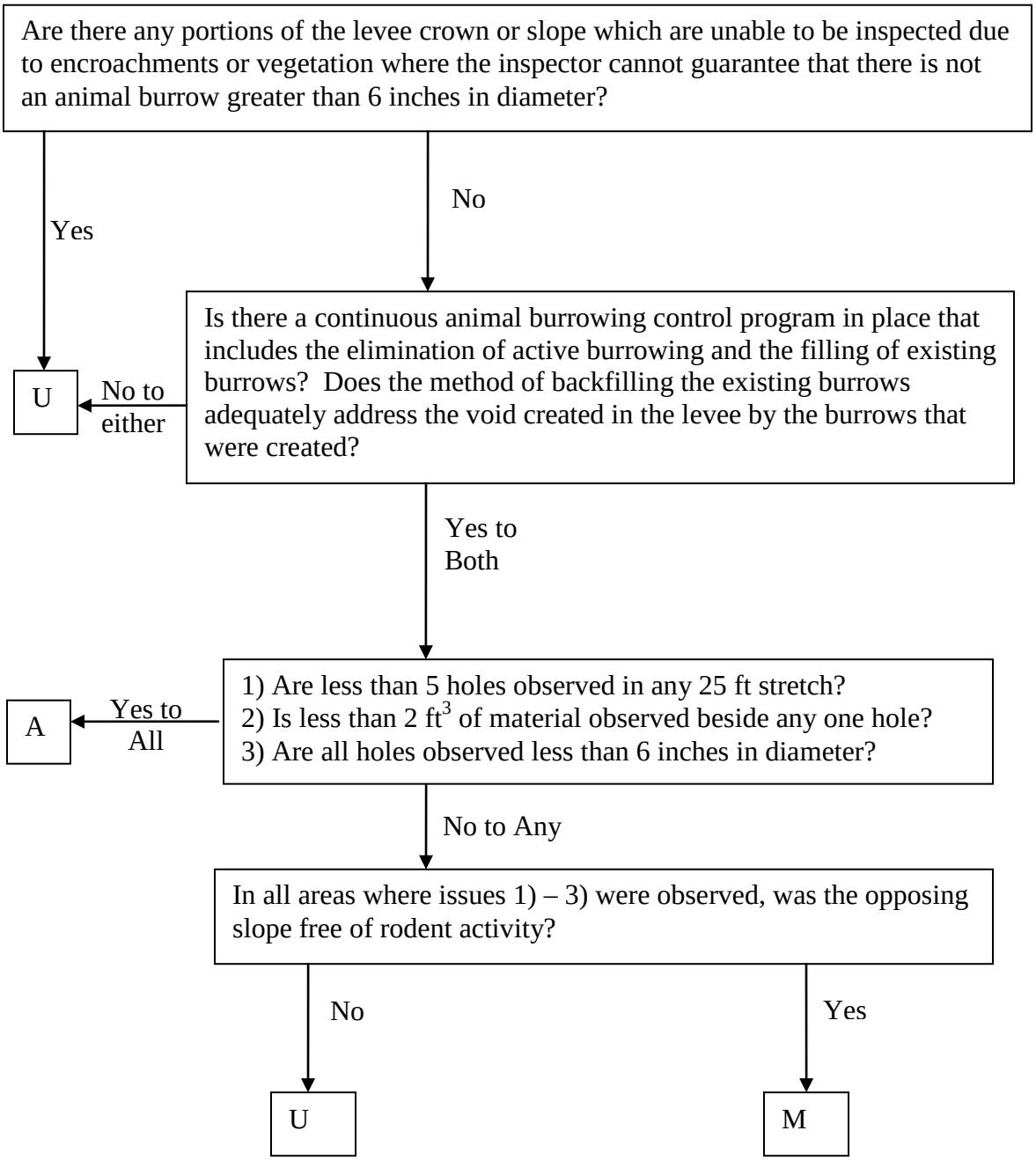
8. Depressions/ Rutting



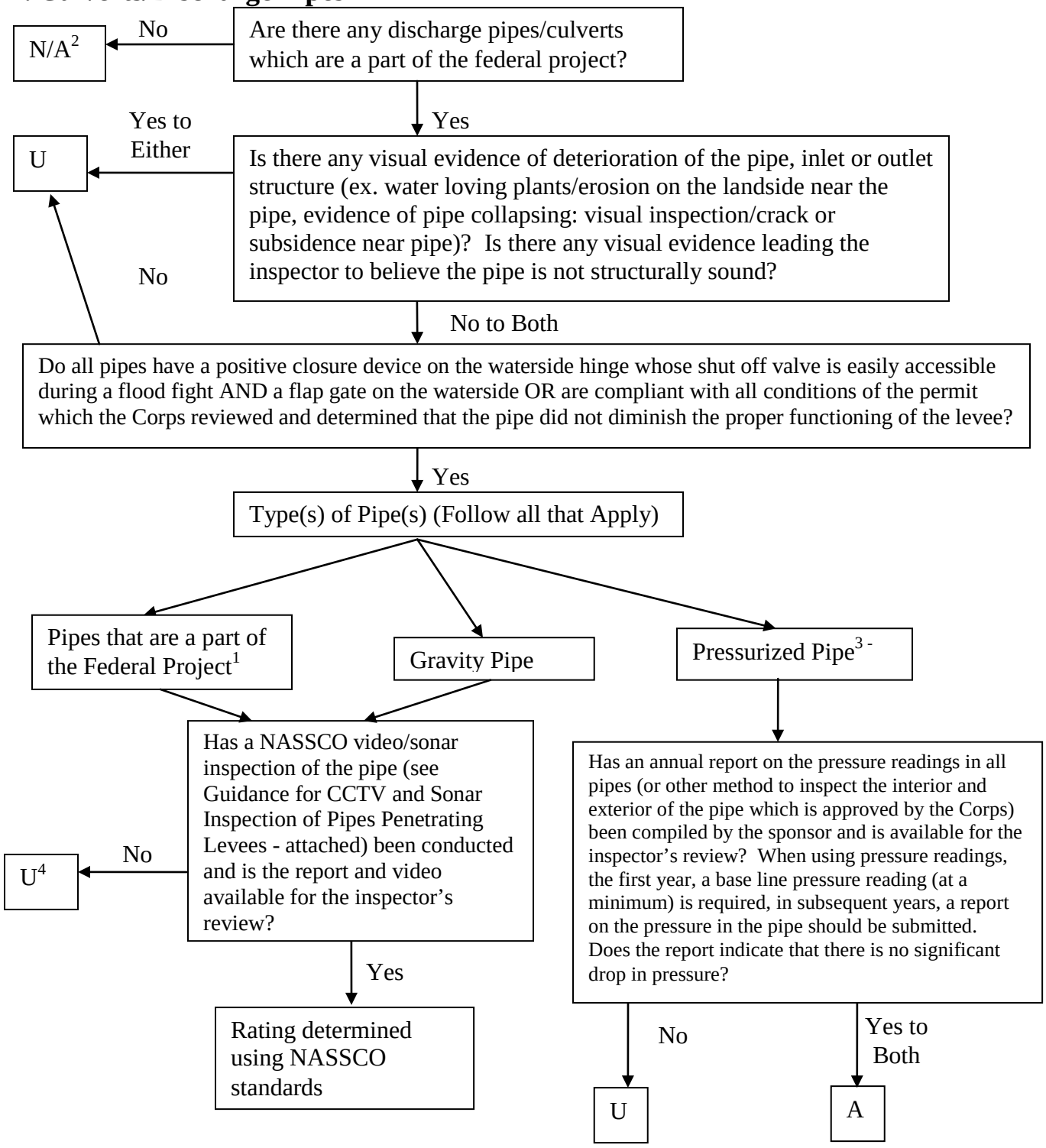
9. Cracking


Are there any cracks which are present year round (i.e. this does not include seasonal summer cracks which disappear in the winter, which occur as a result of the clay in the levee expanding and contracting)? Are there any known weak points in the levee (historical flood fight areas, levee repair areas) near the observed cracks?
No to Both
A
Yes to Either
Are there any cracks in the levee that are more than 6 inches deep? Are there any longitudinal cracks which are longer than the height of the levee? Is there any vertical movement along any crack in the levee? Are there any transverse cracks which extend the entire levee width?
Yes to Any
U
No to All
Are there any cracks greater than 2 inches deep? Are there any cracks which transverse more than 1/3 of the levee crown? Are there any longitudinal cracks which are longer than 1/3 of the height of the levee?
Yes to Any
M
No to All
A

10. Animal Control



11. Culverts/Discharge Pipes[1]



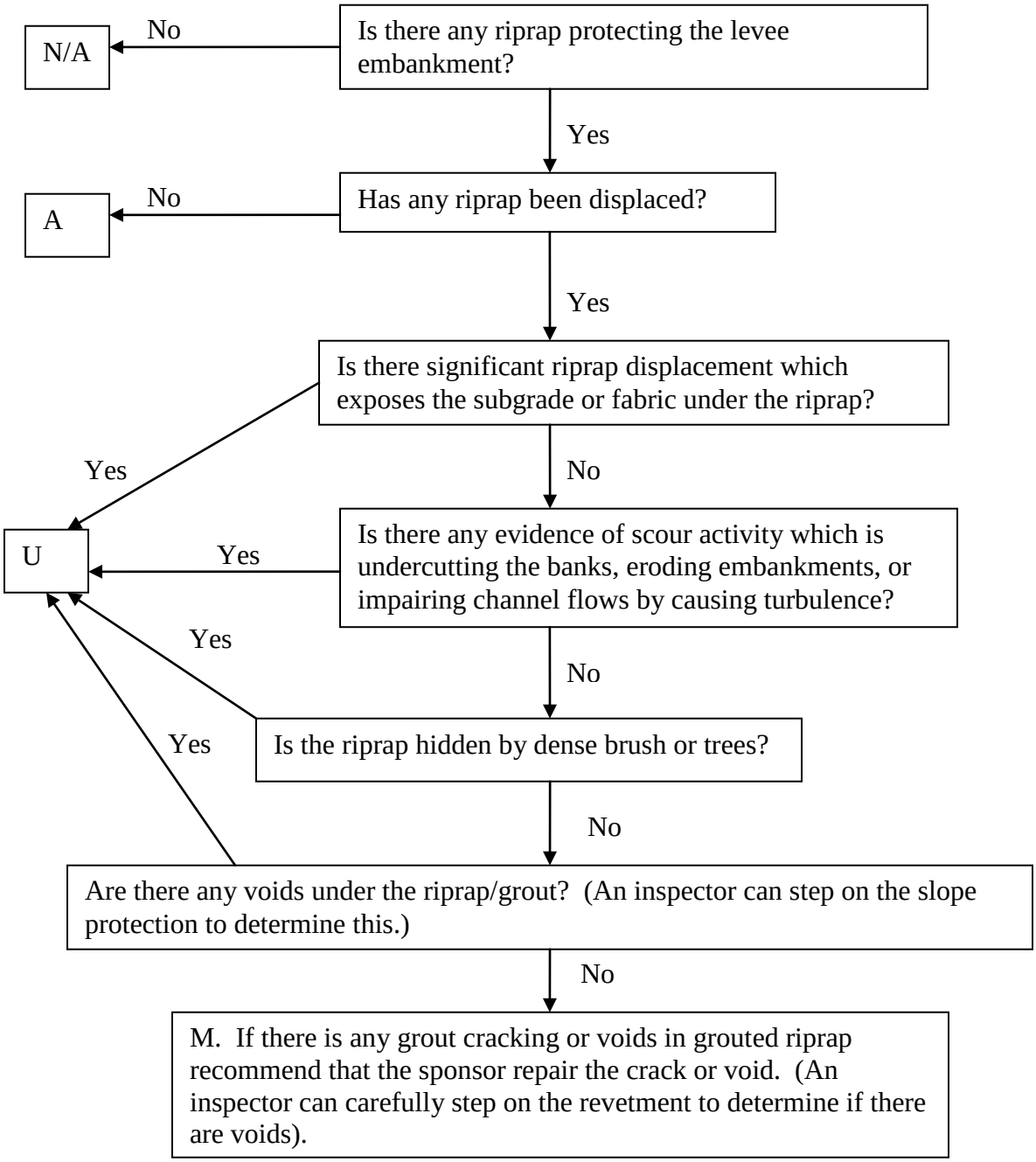
[1] This item is used to evaluate any pipe passing through the levee cross section that is part of the Federal flood control project. If the O&M Manual specified that a pipe is attached to a pump station or is to be used for interior drainage, then it is also evaluated in the "Pump Station" or "Interior Drainage" Checklist. Drainage canals would also be covered in the interior drainage checklist.

[2] If there are any discharge pipes/culverts that are not part of the federal project, this flow chart should be followed, in addition to the flow chart in item 3. "Encroachments" and the issue will receive the lower of the two ratings, but the rating should be entered under item 3. "Encroachments".

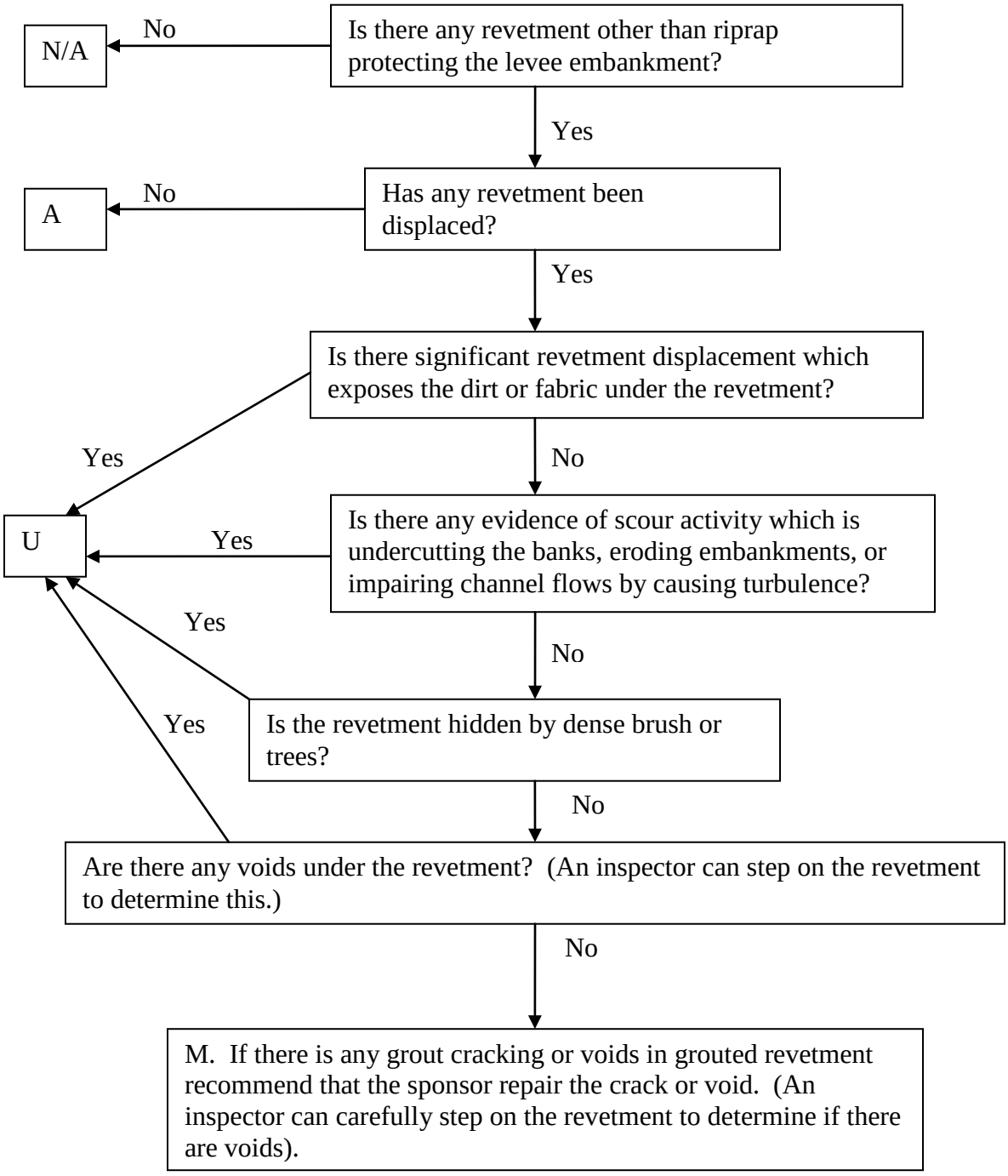
[3] Pressurized pipes – all pipes subject to pressure (continuous or intermittent) this includes irrigation pipes, gas lines and water lines.

[4] Not having a video inspection, or the intent therein met (e.g. sonar inspection, pressure report), will lead to an unacceptable *item* rating. However, if this is the only issue (not having the video inspection) which could lead to an overall unacceptable *segment* rating it is SPK Policy that this alone does not imply an unacceptable *segment* rating. However, if a video inspection is not submitted within an acceptable period of time, not to exceed two years, an unacceptable *segment* rating will result.

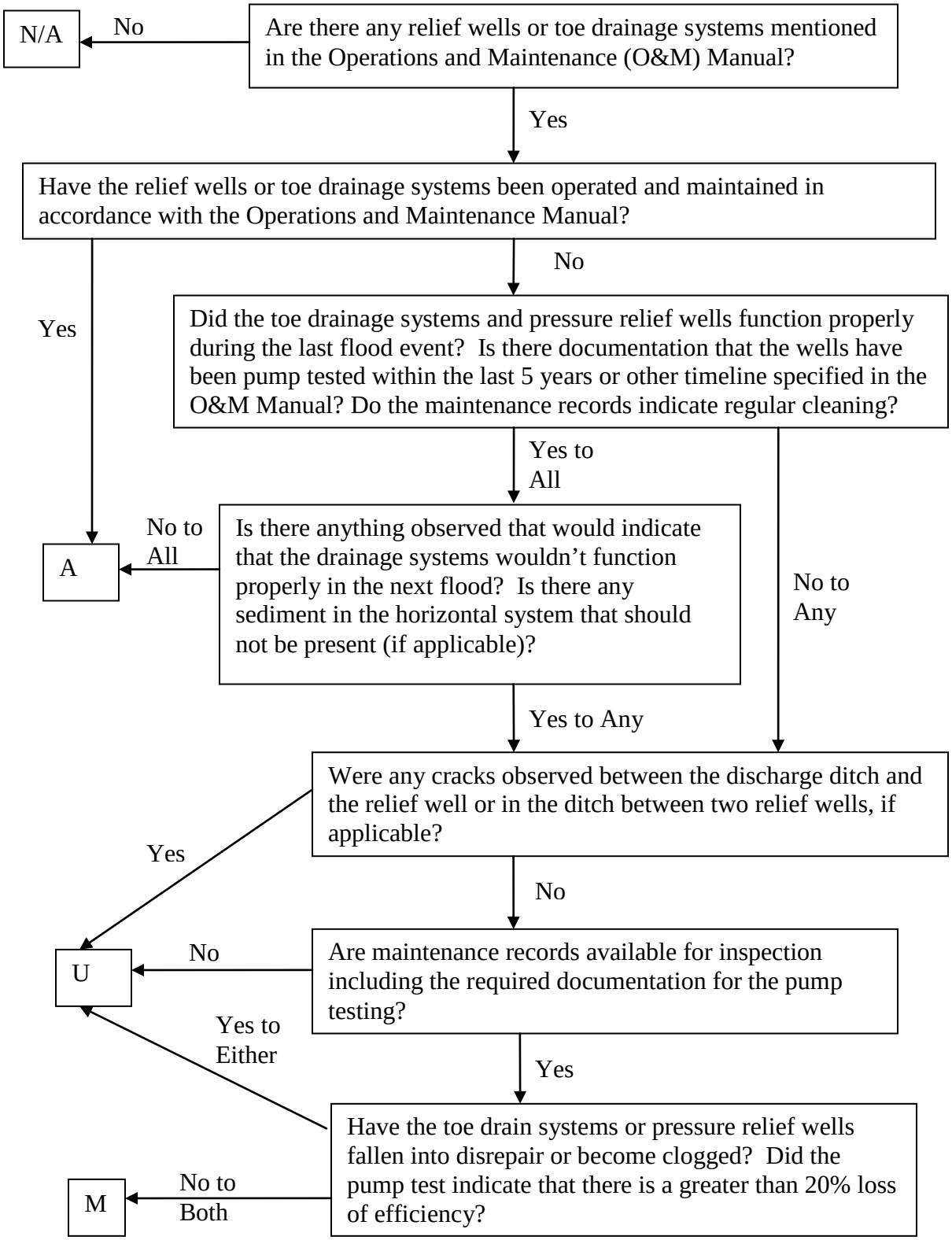
12. Riprap Revetment & Bank Protection (Armoring using Stone)



13. Revetments

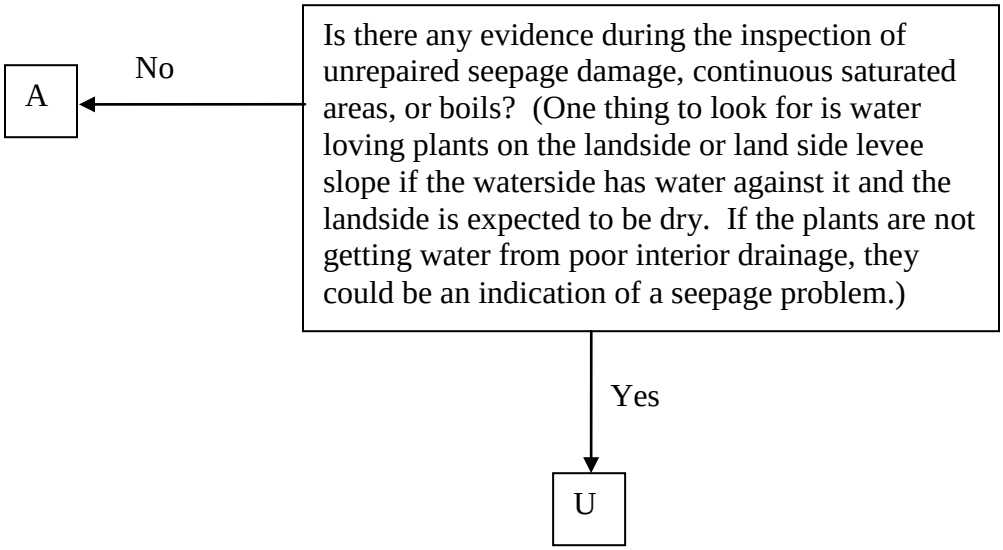


14. Underseepage Relief Wells/Toe Drainage System



For guidance on pump testing see EM 1110-2-1914, which can be found on the Corps Publications Page (http://140.194.76.129/publications/index.html),

15. Seepage


Is there any evidence during the inspection of unrepaired seepage damage, continuous saturated areas, or boils? (One thing to look for is water loving plants on the landside or land side levee slope if the waterside has water against it and the landside is expected to be dry. If the plants are not getting water from poor interior drainage, they could be an indication of a seepage problem.)
No
A
Yes
U

GUIDANCE FOR CCTV AND SONAR INSPECTION PIPES PENETRATING LEVEES

30 March 2010

BACKGROUND

Inspection of the interior of gravity pipes that penetrate under or through flood protection systems, and discharge pipes from pump stations, is necessary during pipe condition evaluation. This assists in developing an understanding of the need to replace or rehabilitate a pipe, and selecting appropriate and economical solutions for deteriorated pipes. Pipes are also inspected after replacement or rehabilitation to document the new baseline condition for the pipe.

Pipes of at least 48-inch diameter may be inspected by walking through the pipe when it is determined safe to do so, and documenting the walk-through with a Closed Circuit Television (CCTV) camera. Other pipes (less than 48 inches in diameter or larger pipes that are unsafe to enter) must be inspected remotely, using the methods described in this guidance.

INSPECTION PROCEDURES

Pipe inspections are most efficient when planned and executed so that fieldwork is performed during periods of low or no flow in the pipe. Removal of small roots and debris is required prior to inspection. All debris is removed from the sewer system and properly disposed of with no debris passing downstream.

Pipes are inspected using either CCTV cameras, sonar devices, or both. The method(s) used are determined by the presence or absence of water in the pipe, the pipe material, and the wall configuration. CCTV inspection is the preferred method because it provides a complete view of the pipe interior. Sonar inspection, which may be used on non-metallic pipes that contain water, portrays offsets and distortions in the interior pipe profile as well as sediment build up in the pipe invert. Sonar inspection will not reveal the presence of fractures without offset, cracks, corrosion or corrosion-induced section loss. The process described below and illustrated in Figure 1 is used to determine proper inspection protocols.

Metallic pipes, including corrugated metal pipes (CMPs) and cast iron pipes, are subject to corrosion and must be CCTV inspected because sonar methods are not able to detect and quantify the nature and extent of corrosion. Therefore, metallic pipes must be temporarily bypassed and dewatered prior to inspection so that 100% of the interior pipe surface is visible to the CCTV camera.

Non-metallic pipes are also dewatered and CCTV inspected when reasonably possible. When non-metallic pipes cannot be dewatered, partially submerged pipes are assessed using CCTV inspection above water and sonar inspection below water. Fully submerged non-metallic pipes are inspected using only sonar inspection. When sonar inspection of a submerged pipe indicates that the pipe cross-sectional profile deviates from the as-built condition, the pipe must be dewatered and CCTV inspected.

The PACP provides procedural guidelines for CCTV pipe inspection. An inspection system specifically designed and constructed for pipe inspection is used. The CCTV camera is capable of panning 360° and tilting 270°. The camera is positioned in the center of circular pipes and 2/3 the height in oval pipes. Lighting for the CCTV camera is suitable to allow a clear picture of the entire periphery of the pipe. The camera is capable of operating in 100% humidity conditions. The minimum acceptable camera resolution is 500 lines. The CCTV monitor and other components of the CCTV system are capable of producing a color picture/CCTV quality to the Owner's satisfaction.

The CCTV camera moves through the sewer at a constant rate, stopping when necessary to permit proper documentation of the sewer's condition for

coding. The CCTV camera does not move at a speed greater than 25 feet per minute. Obtain a still picture (color jpeg format) of all significant defects observed during inspection. Record segment, location along sewer, clock position, time and defect code for each picture. Obtain a still photograph coaxial with each lateral.

Sonar inspection equipment is positioned in the pipe in accordance with the equipment manufacturer's recommendations, and makes a complete 360 degree inspection of the pipe circumference at one inch intervals along the length of the pipe.

During the inspection the following information is clearly and continuously displayed on the periphery of the screen, monitor and CCTV recording: starting location ID, ending location ID, and distance from starting manhole or headwall. A global positioning System device is used to document the inlet and outlet locations.

If inspection of an entire sewer segment cannot be completed due to a collapse, excessive deformation, debris, intruding connections, obstructions or large displaced joints, move equipment to the downstream manhole/headwall and attempt inspection in the upstream direction. Advise the Owner's Representative on a daily basis if the complete sewer segment cannot be inspected. Track all locations where a complete inspection is not obtained and clearly document the length of sewer not inspected, location, segment, distance from adjacent manholes, etc.

LIMITS OF CCTV AND SONAR INSPECTION

Within Levee Embankment Sections. Pipes penetrating the levee embankment cross section are inspected from headwall to headwall.

Beneath Levee Embankment Sections. Pipes underlying levee embankments which do not daylight at the levee toes are inspected a minimum distance of 15 horizontal feet as measured perpendicular from either toe; however, the inspection continues to the riverside headwall if the pipe does not daylight within the 15 horizontal feet.

T-Wall Sections. Pipes underlying T-Walls are inspected a minimum distance of 8 horizontal feet as measured perpendicular from either side of the base; however, the inspection continues to the riverside headwall if the pipe does not daylight within the 8 horizontal feet.

I-Wall Sections. Pipes underlying I-Walls are inspected a minimum distance of 15 horizontal feet as measured perpendicular from either face of the wall; however, the inspection continues to the riverside headwall if the pipe does not daylight within the 15 horizontal feet.

Discharge Pipes from Pump Stations. Discharge pipes from the pump stations are inspected between the pump discharge and the end of the discharge line at the headwall/gate well. If the discharge pipe ends in a gate well, inspection from the gate well to the headwall at the river is required. In this case, pipe access may be possible through an air vent and a push camera with adequate lighting may be used.

PIPE CONDITION CODING

Pipe condition coding for pipes subjected to CCTV inspection is done in accordance with the National Association of Sewer Service Companies' (NASSCO) Pipeline Assessment Certification Program (PACP). The company performing the inspection is required to provide qualifications for performing this work. Resumes of the individuals performing the work documenting experience and NASSCO's PACP coding certification are required. Personnel must demonstrate experience on similar projects and a minimum of 1-year experience in pipe inspection and PACP coding in accordance with NASSCO's pipeline assessment program.

The information called out includes, but is not limited to the following:

- Structural condition and deformation of the pipe walls
- Segment length (from inside walls of adjacent manholes)

- Manhole depth (invert to top of casting to nearest 0.1 ft)
- Blockages or obstructions
- Condition of joints and pipe walls
- Standing water/sag conditions
- Infiltration/exfiltration
- Fluctuations in water level
- Size, location and condition of sewer laterals with the clock position

Distance measurements are referenced to the nearest 0.1 foot, using a readily identifiable baseline such as a headwall, manhole, or sluice gate.

The five PACP defect grades are shown in Table 1, and an example PACP report is provided in Attachment 1. Further details of the PACP condition grading system are available at www.nassco.org.

The NASSCO PACP coding procedure does not apply to pipes or portions of pipes where sonar inspection is used. A narrative description of the results of sonar inspection is provided along with profile images of pipe sections that display deterioration, profile offset, sediment accumulation, or any other concern with pipe integrity.

Table 1. PACP Defect Grades

Grade	Description	Estimated Time to Failure
1	EXCELLENT: Minor Defects.	Unlikely in the foreseeable future
2	GOOD: Defects that have not begun to deteriorate.	20 years or more
3	FAIR: Moderate defects that will continue to deteriorate.	10 to 20 years
4	POOR: Severe defects that will become grade 5 defects within the foreseeable future.	5 to 10 years
5	IMMEDIATE ATTENTION: Defects requiring immediate attention.	Has failed or will likely fail within the next 5 years

REPORTS AND SUBMITTALS

Submit two copies of the following items within two weeks following completion of all required CCTV or sonar inspection activities:

- Electronic inspection videos recorded and organized on CD or DVD.
- Electronic still-capture pictures and sonar images of significant defects on CD or DVD.
- Printed inspection logs with As-Built stationing, defect codes, and the PACP Ratings including, the Structural, Operation and Maintenance, Overall Quick Rating shall be provided (see example in Attachment 1). Also provide an overall map locating these with pipe stationing shown. Sonar inspection defects are also mapped in a similar manner.
- List of standard PACP defect codes.
- Grade of the pipe invert in percent.
- Coordinates of the pipe inlet and outlet determined by handheld GPS, with estimated accuracy reported.
- Copy of as-built drawing with an arrow added to show the pipe location and direction of CCTV camera travel (can be hand drawn).

Inspection Reports are provided in a bound report.

The inspection video is either configured for viewing using the latest version of Windows Media Player, or the appropriate viewing software must be submitted on each CD or DVD. Files are configured to have the ability to use all features of the CCTV player including fast forward capability.

No payment is made for poor or unacceptable quality CCTVs or for portions of pipes that are not inspected for any reason. If, in the opinion of the Owner, the CCTV is of such poor quality that the condition of the sewer cannot be adequately assessed, the Contractor re-inspects the unacceptable segments and resubmit all deliverables for that segment at no additional cost to the Owner.

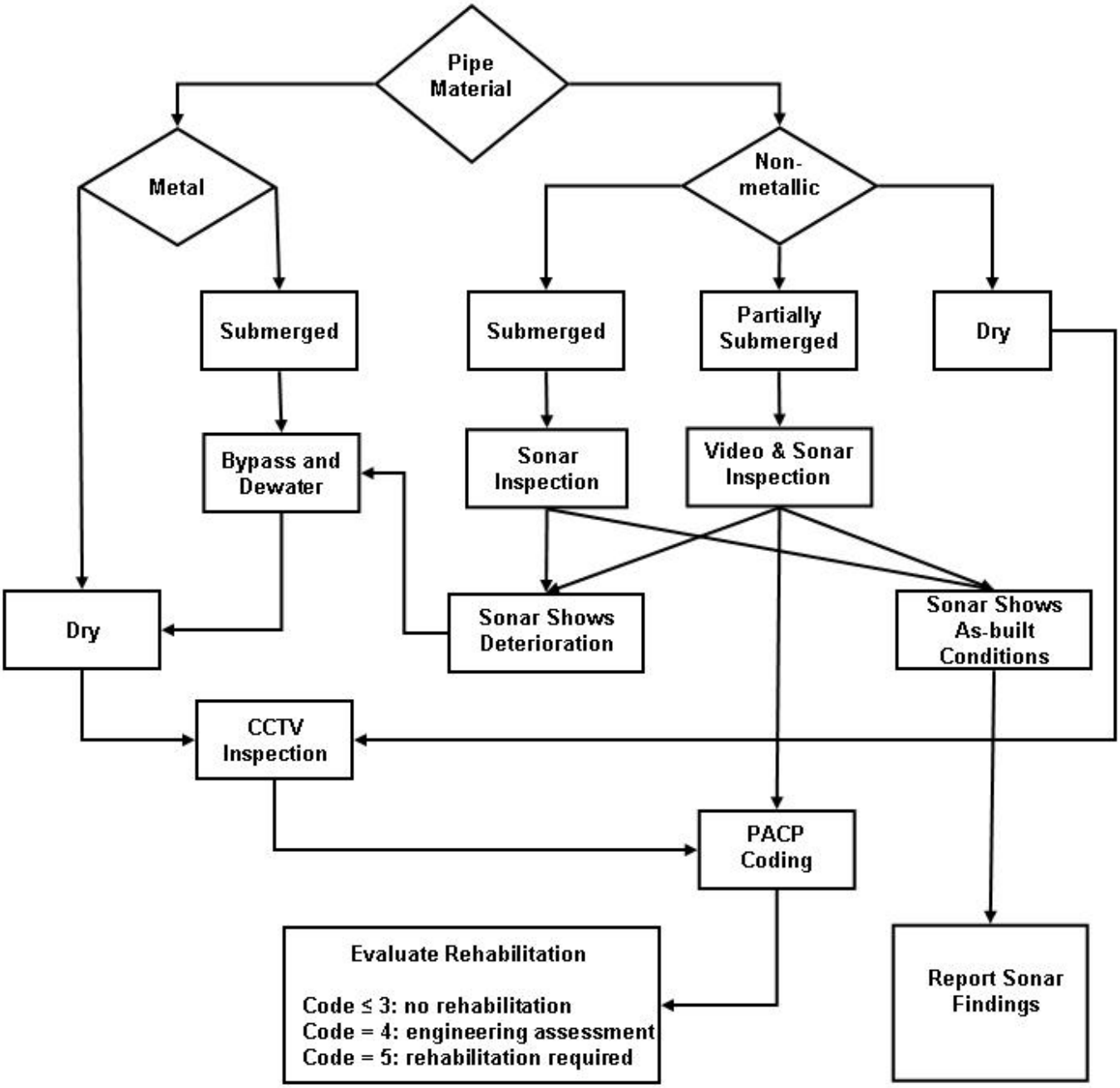


Figure 1. Pipe Condition Assessment Procedure

ATTACHMENT 1
EXAMPLE PACP REPORT

Header Report

PROJECT:

Name:	Paducah Ky
Address:	
	Paducah, KY
Phone:	(502) 608-0052

PROJECT

City	Paducah	Date	2007/11/30
Owner	Paducah, KY	Time	3:53:06 PM
Customer	Florence Peterson	Weather	Dry
PO Number:	1044	Media Label	SubCam
Surveyed By	Scott Niswonger	Sheet:	
Certificate Number:	U-306-2958		

LOCATION

Location (St. & No.)"	2580 Cairo Rd	Upstream MH:	147+25AIN
N/A		Downstream MH:	147+25AEX
N/A		Pipe Segment Ref.:	
N/A		Location Code	Easement/Right of Way
Fur. Loc. Details:	Old Cairo Rd & floodwall near Lift Station#1		

PIPE

Material	Corrugated Metal Pipe	Pre-Cleaning	No Pre-Cleaning
Shape	Circular	Date Cleaned	
Height (Diameter)	24	Total Length	78.6
Width	24	Length Surveyed	78.6
Pipe Joint Length		Dir of Survey:	Downstream
Flow Control	Not Controlled		

GENERAL INFORMATION

Use of Sewer	Rim to Invert(U):
Purpose	Grade to Invert(U):
Sewer Category	Rim to Grade(U):
Year Laid	Rim to Invert(D):
Year Reviewed	Grade to Invert(D):
Lining Method	Rim to Grade(D):

Remarks: ran from streetside

Custom Header Fields For This Project Only

N/A	N/A
N/A	N/A
N/A	N/A
N/A	

ATTACHMENT 1
EXAMPLE PACP REPORT

Observation & Defect Listing

City	Surveyors Name	Certificate #	Date	Sht. No.
Paducah		U-306-2958	2007/11/30	2

Location Code	Location (Street and Number)	Further Location Details
Easement/Right of Way	2580 Cairo Rd	Old Cairo Rd & floodwall near Lift Station#1

N/A	N/A	N/A	Upstream Manhole #	Downstream Manhole #
			147+25AIN	147+25AEX

Pipe Seg. Ref.	Material	Shape	Height	Width	Jt. Lgth.	Total Lgth.	Lgth. Surv.
	Corrugated Metal Pipe	Circular	24	24		78.6	78.6

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	AEP - End of Pipe					☐			
Remarks: 147+25AIN									
0.0 ft.	MWL - Water Level				5	☐			
0.0 ft.	MGO - General Observation					☐			
Remarks: bottom reinforcement deteriated									
14.5 ft.	OBR - Obstacle Rocks				15	☐	5	7	3
63.4 ft.	HVV - Hole Void Visible					☐	5	7	5
67.8 ft.	HVV - Hole Void Visible					☐	4		5
69.6 ft.	HVV - Hole Void Visible					☐	4		5
75.9 ft.	RPP - Repair Patch					☐	4	8	
Remarks: repair with mortar									
78.6 ft.	AEP - End of Pipe					☐			
Remarks: 147+25AEX									

ATTACHMENT 1
EXAMPLE PACP REPORT

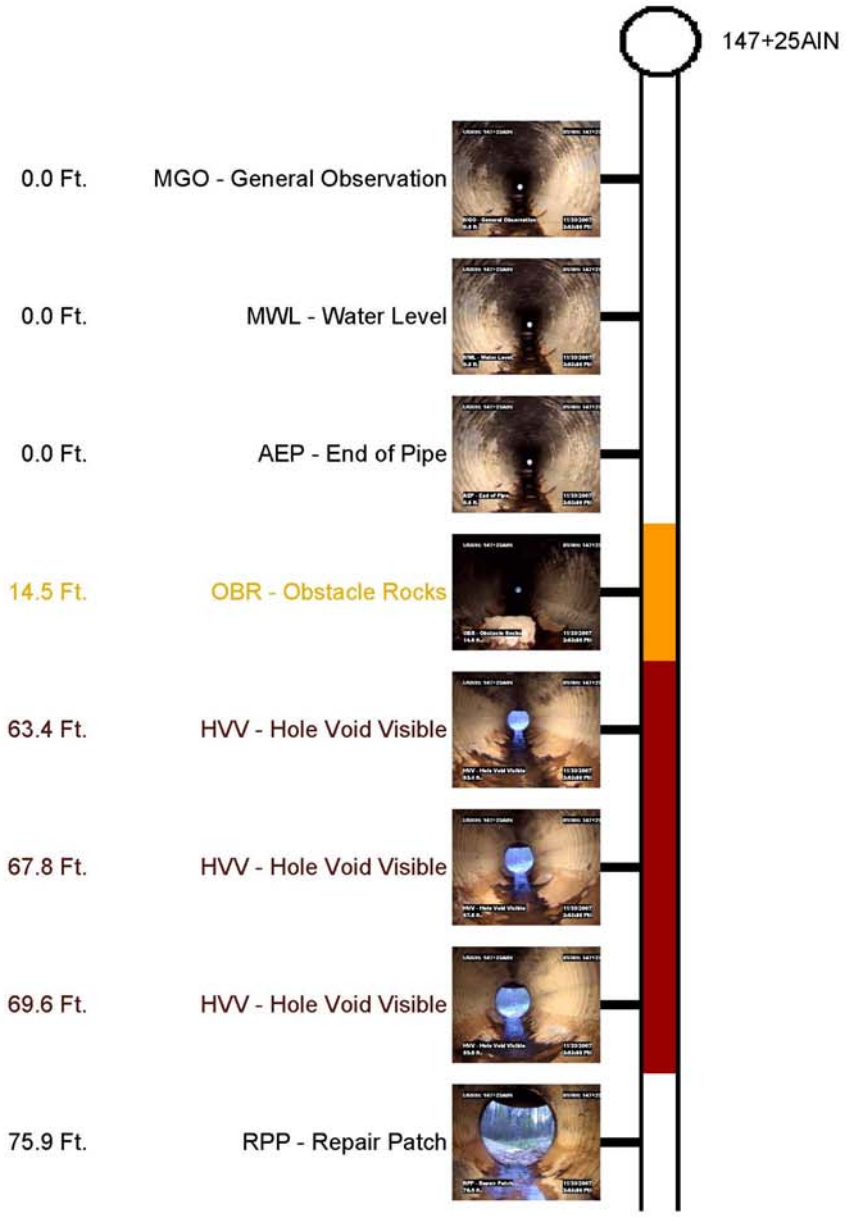
Defect Listing Plot with Images

City	Surveyors Name	Certificate #	Date	Sht. No.
Paducah		U-306-2958	2007/11/30	3

Location Code	Location (Street and Number)	Further Location Details
Easement/Right of Way	2580 Cairo Rd	Old Cairo Rd & floodwall near Lift Station#1

N/A	N/A	N/A	Upstream Manhole #	Downstream Manhole #
			147+25AIN	147+25AEX

Pipe Seg. Ref.	Material	Shape	Height	Width	Jt. Lgth.	Total Lgth.	Lgth. Surv.
	Corrugated Metal Pipe	Circular	24	24		78.6	78.6



ATTACHMENT 1
EXAMPLE PACP REPORT

Defect Listing Plot with Images

City	Surveyors Name	Certificate #	Date	Sht. No.
Paducah		U-306-2958	2007/11/30	4

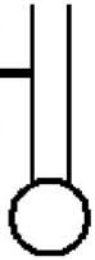
Location Code	Location (Street and Number)	Further Location Details
Easement/Right of Way	2580 Cairo Rd	Old Cairo Rd & floodwall near Lift Station#1

N/A	N/A	N/A	Upstream Manhole #	Downstream Manhole #
			147+25AIN	147+25AEX

Pipe Seg. Ref.	Material	Shape	Height	Width	Jt. Lgth.	Total Lgth.	Lgth. Surv.
	Corrugated Metal Pipe	Circular	24	24		78.6	78.6

78.6 Ft.

AEP - End of Pipe



147+25AEX

ATTACHMENT 1
EXAMPLE PACP REPORT

Observation & Defect Images

City	Surveyors Name	Certificate #	Date	Sht. No.
Paducah		U-306-2958	2007/11/30	5

Location Code	Location (Street and Number)	Further Location Details
Easement/Right of Way	2580 Cairo Rd	Old Cairo Rd & floodwall near Lift Station#1

N/A	N/A	N/A	Upstream Manhole #	Downstream Manhole #
			147+25AIN	147+25AEX

Pipe Seg. Ref.	Material	Shape	Height	Width	Jt. Lgth.	Total Lgth.	Lgth. Surv.
	Corrugated Metal Pipe	Circular	24	24		78.6	78.6

Distance: 0.0 Ft. Grade: 0
Condition: AEP - End of Pipe
Remarks: 147+25AIN

Distance: 0.0 Ft. Grade: 0
Condition: MWL - Water Level
Remarks:

Distance: 0.0 Ft. Grade: 0
Condition: MGO - General Observation
Remarks: bottom reinforcement deteriated

Distance: 14.5 Ft. Grade: 3
Condition: OBR - Obstacle Rocks
Remarks:

ATTACHMENT 1
EXAMPLE PACP REPORT

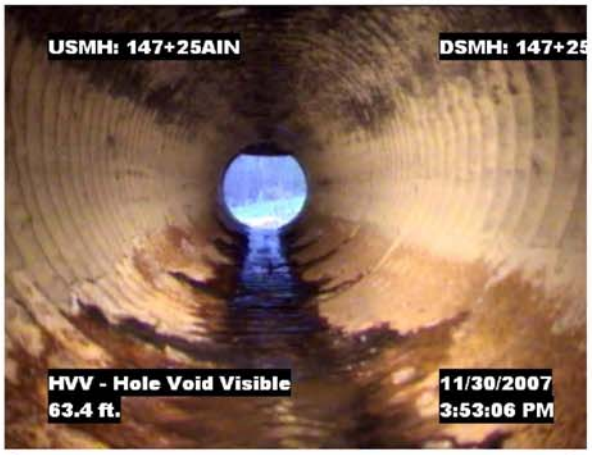
Observation & Defect Images

City	Surveyors Name	Certificate #	Date	Sht. No.
Paducah		U-306-2958	2007/11/30	6

Location Code	Location (Street and Number)	Further Location Details
Easement/Right of Way	2580 Cairo Rd	Old Cairo Rd & floodwall near Lift Station#1

N/A	N/A	N/A	Upstream Manhole #	Downstream Manhole #
			147+25AIN	147+25AEX

Pipe Seg. Ref.	Material	Shape	Height	Width	Jt. Lgth.	Total Lgth.	Lgth. Surv.
	Corrugated Metal Pipe	Circular	24	24		78.6	78.6



Distance: 63.4 Ft. Grade: 5
Condition: HVV - Hole Void Visible
Remarks:

Distance: 67.8 Ft. Grade: 5
Condition: HVV - Hole Void Visible
Remarks:

Distance: 69.6 Ft. Grade: 5
Condition: HVV - Hole Void Visible
Remarks:

Distance: 75.9 Ft. Grade: 0
Condition: RPP - Repair Patch
Remarks: repair with mortar

ATTACHMENT 1
EXAMPLE PACP REPORT

Observation & Defect Images

City	Surveyors Name	Certificate #	Date	Sht. No.
Paducah		U-306-2958	2007/11/30	7

Location Code	Location (Street and Number)	Further Location Details
Easement/Right of Way	2580 Cairo Rd	Old Cairo Rd & floodwall near Lift Station#1

N/A	N/A	N/A	Upstream Manhole #	Downstream Manhole #
			147+25AIN	147+25AEX

Pipe Seg. Ref.	Material	Shape	Height	Width	Jt. Lgth.	Total Lgth.	Lgth. Surv.
	Corrugated Metal Pipe	Circular	24	24		78.6	78.6

Distance: 78.6 Ft. Grade: 0
Condition: AEP - End of Pipe
Remarks: 147+25AEX

ATTACHMENT 1
EXAMPLE PACP REPORT

Condition Grades

City	Surveyors Name	Certificate #	Date	Sht. No.
Paducah		U-306-2958	2007/11/30	8

Location Code	Location (Street and Number)	Further Location Details
Easement/Right of Way	2580 Cairo Rd	Old Cairo Rd & floodwall near Lift Station#1

N/A	N/A	N/A	Upstream Manhole #	Downstream Manhole #
			147+25AIN	147+25AEX

Pipe Seg. Ref.	Material	Shape	Height	Width	Jt. Lgth.	Total Lgth.	Lgth. Surv.
	Corrugated Metal Pipe	Circular	24	24		78.6	78.6

Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	0	0	1	0	0
	2	0	0	2	0	0	2	0	0
	3	0	0	3	1	3	3	1	3
	4	0	0	4	0	0	4	0	0
	5	3	15	5	0	0	5	3	15
Continuous Defects									
Code / ID / Length									
	Subtotals	3		Subtotals	1		Subtotals	4	
SUMMARY	Pipe Rating		15	Pipe Rating		3	Overall Pipe Rating		18
	Structural Index		5.0	O&M Index		3.0	Overall Index		4.5
	Str. Quick Rating		5300	O&M Quick Rating		3100	Ovrl. Quick Rating		5331

US Army Corps of Engineers®

Flood Damage Reduction Segment / System Inspection Report

Name of Segment / System: _____

Public Sponsor(s): _____

Public Sponsor Representative: _____

Sponsor Phone: _____

Sponsor Email: _____

Corps of Engineers Inspector: _____ Date of Inspection: _____

Inspection Report Prepared By: _____ Date Report Prepared: _____

Internal Technical Review (for Periodic Inspections) By: _____ Date of ITR: _____

Final Approved By: _____ Date Approved: _____

Type of Inspection:	☐ **Initial Eligibility Inspection** ☐ **Continuing Eligibility Inspection (Routine)** ☐ **Continuing Eligibility Inspection (Periodic)**	Overall Segment / System Rating:	☐ **Acceptable** ☐ **Minimally Acceptable** ☐ **Unacceptable**
Contents of Report:	☐ **Instructions** ☐ **Initial Eligibility Inspection** ☐ **General Items for All Flood Control Works** ☐ **Levee Embankment** ☐ **Concrete Floodwalls** ☐ **Sheet Pile and Concrete I-walls** ☐ **Interior Drainage System** ☐ **Pump Stations** ☐ **FDR System Channels**	Note: In addition to the report contents indicated here, a plan view drawing of the system, with stationing, should be included with this report to reference locations of items rated less than acceptable. Photos of general system condition and any noted deficiencies should also be attached.	

US Army Corps
of Engineers®

Flood Damage Reduction Segment / System
Public Sponsor Pre-Inspection Form

The following information is to be provided by the levee district sponsor prior to an inspection. This information will be used to help evaluate the organizational capability of the levee district to manage the levee segment / system maintenance program.

1. Levee segment / system and district: (name of the segment / system and levee district)
2. Reporting period: (month/day/year to month/day/year)
3. Summary of maintenance required by last inspection report:
4. Summary of maintenance performed this reporting period:
5. Summary of maintenance planned next reporting period:
6. Summary of changes to segment / system since last inspection:
7. Problems/ issues requiring the assistance of the US Army Corps of Engineers:

Public Sponsor Pre-Inspection Report

The following information is to be provided by the levee district sponsor prior to an inspection

8. Levee district organization: (elected or appointed levee district officials and key employees)

Name	Position	Mailing Address	Phone Number	Email Address

General Instructions for the Inspection of Flood Damage Reduction Segments / Systems

A. Purpose of USACE Inspections:

The primary purpose of these inspections is to prevent loss of life and catastrophic damages; preserve the value of Federal investments, and to encourage non-Federal sponsors to bear responsibility for their own protection. Inspections should assure that Flood Damage Reduction structures and facilities are continually maintained and operated as necessary to obtain the maximum benefits. Inspections are also conducted to determine eligibility for Rehabilitation Assistance under authority of PL 84-99 for Federal and non-Federal systems. (ER 1130-2-530, ER 500-1-1)

B. Types of Inspections:

The Corps conducts several types of inspections of Flood Damage Reduction systems, as outlined below:

Initial Eligibility Inspections	Continuing Eligibility Inspections	
	Routine Inspections	**Periodic Inspections**
IEIs are conducted to determine whether a non-Federally constructed Flood Damage Reduction system meets the minimum criteria and standards set forth by the Corps for initial inclusion into the Rehabilitation and Inspection Program.	RIs are intended to verify proper maintenance, owner preparedness, and component operation.	PIs are intended to verify proper maintenance and component operation and to evaluate operational adequacy, structural stability, and safety of the system. Periodic Inspections evaluate the system's original design criteria vs. current design criteria to determine potential performance impacts, evaluate the current conditions, and compare the design loads and design analysis used against current design standards. This is to be done to identify components and features for the sponsor that need to be monitored more closely over time or corrected as needed. (Periodic Inspections are used as the basis of risk assessments.)

C. Inspection Boundaries:

Inspections should be conducted so as to rate each Flood Damage Reduction "Segment" of the system. The overall system rating will be the lowest segment rating in the system.

Project	System	Segment
A flood damage reduction project is made up of one or more flood damage reduction systems which were under the same authorization.	A flood damage reduction system is made up of one or more flood damage reduction segments which collectively provide flood damage reduction to a defined area. Failure of one segment within a system constitutes failure of the entire system. Failure of one system does not affect another system.	A flood damage reduction segment is defined as a discrete portion of a flood damage reduction system that is operated and maintained by a single entity. A flood damage reduction segment can be made up of one or more features (levee, floodwall, pump stations, etc).

D. Land Use Definitions:

The following three definitions are intended for use in determining minimum required inspection intervals and initial requirements for inclusion into the Rehabilitation and Inspection Program. Inspections should be considered for all systems that would result in significant environmental or economic impact upon failure regardless of specific land use.

Agricultural	Rural	Urban
Protected population in the range of zero to 5 households per square mile protected.	Protected population in the range of 6 to 20 households per square mile protected.	Greater than 20 households per square mile; major industrial areas with significant infrastructure investment. Some protected urban areas have no permanent population but may be industrial areas with high value infrastructure with no overnight population.

E. Use of the Inspection Report Template:

The report template is intended for use in all Army Corps of Engineers inspections of levee and floodwall systems and flood damage reduction channels. The section of the template labeled "Initial Eligibility" only needs to be completed during Initial Eligibility Inspections of Non-Federally constructed Flood Damage Reduction Systems. The section labeled "General Items" needs to be completed with every inspection, along with all other sections that correspond to features in the system. The section labeled "Public Sponsor Pre-Inspection Report" is intended for completion before the inspection, if possible.

F. Individual Item / Component Ratings:

Assessment of individual components rated during the inspection should be based on the criteria provided in the inspection report template, though inspectors may incorporate additional items into the report based on the characteristics of the system. The assessment of individual components should be based on the following definitions.

Acceptable Item	Minimally Acceptable Item	Unacceptable Item
The inspected item is in satisfactory condition, with no deficiencies, and will function as intended during the next flood event.	The inspected item has one or more minor deficiencies that need to be corrected. The minor deficiency or deficiencies will not seriously impair the functioning of the item as intended during the next flood event.	The inspected item has one or more serious deficiencies that need to be corrected. The serious deficiency or deficiencies will seriously impair the functioning of the item as intended during the next flood event.

G. Overall Segment / System Ratings:

Determination of the overall system rating is based on the definitions below. Note that an Unacceptable System Rating may be either based on an engineering determination that concluded that noted deficiencies would prevent the system from functioning as intended during the next flood event, or based on the sponsor's demonstrated lack of commitment or inability to correct serious deficiencies in a timely manner.

Acceptable System	Minimally Acceptable System	Unacceptable System
All items or components are rated as Acceptable.	One or more items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable items would not prevent the segment / system from performing as intended during the next flood event.	One or more items are rated as Unacceptable and would prevent the segment / system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

H. Eligibility for PL84-99 Rehabilitation Assistance:

Inspected systems that are not operated and maintained by the Federal government may be Active in the Corps' Rehabilitation and Inspection Program (RIP) and eligible for rehabilitation assistance from the Corps as defined below:

If the Overall System Rating is Acceptable	If the Overall System Rating is Minimally Acceptable	If the Overall System Rating is Unacceptable
The system is active in the RIP and eligible for PL84-99 rehabilitation assistance.	The system is Active in the RIP during the time that it takes to make needed corrections. Active systems are eligible for rehabilitation assistance. However, if the sponsor does not present USACE with proof that serious deficiencies (which had previously resulted in a minimally acceptable system rating) were corrected within the established timeframe, then the system will become Inactive in the RIP.	The system is Inactive in the RIP, and the status will remain Inactive until the sponsor presents USACE with proof that all items rated Unacceptable have been corrected. Inactive systems are ineligible for rehabilitation assistance.

I. Reporting:

After the inspection, the Corps is responsible for assembling an inspection report (or a summary report if it was a Periodic Inspection) including the following information:

a. All sections of the report template used during the inspection, including the cover and pre-inspection materials. (Supplemental data collected, and any sections of the template that weren't used during the inspection do not need to be included with the report.)

b. Photos of the general system condition and noted deficiencies.

c. A plan view drawing of the system, with stationing, to reference locations of items rated less than acceptable.

d. The relative importance of the identified maintenance issues should be specified in the transmittal letter.

e. If the Overall System Rating is Minimally Acceptable, the report needs to establish a timeframe for correction of serious deficiencies noted (not to exceed two years) and indicate that if these items are not corrected within the required timeframe, the system will be rated as Unacceptable and made Inactive in the Rehabilitation Inspection Program.

J. Notification:

Reports are to be disseminated as follows within 30 days of the inspection date.

If the Overall System Rating is Acceptable	If the Overall System Rating is Minimally Acceptable	If the Overall System Rating is Unacceptable
Reports need to be provided to the local sponsor and the county emergency management agency.	Reports need to be provided to the local sponsor, state emergency management agency, county emergency management agency, and to the FEMA region.	Reports need to be provided to the local sponsor, state emergency management agency, county emergency management agency, FEMA region, and to the Congressional delegation within 30 days of the inspection.

Initial Eligibility

For use only during Initial Eligibility Inspections of Non-Federally Constructed Flood Damage Reduction Segments / Systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Public Sponsor (A or U only)		**A**	The Public Sponsor is a legally constituted public body with full authority and capability to perform the terms of its agreement as the non-Federal partner of the Corps for a segment / system, able to pay damages, if necessary, in the event of its failure to perform. The public sponsor may be a State, County, City, Town, Federally recognized Indian Tribe or tribal organization, Alaska Native Corporation, or any political subpart of a State or group of states that has the legal and financial authority and capability to provide the necessary cash contributions and the lands, easements, rights-of-way, relocations, borrow, and dredged or excavated materials disposal areas (LERRD's) necessary for the segment / system, and who could legally hold and save the Federal government free from damages that could potentially arise during post-flood rehabilitations or other work on the segment / system.	
		U	The segment / system does not have a public sponsor as defined above.	
2. Flood Protection (A or U only)		**A**	The principal function of the segment / system is to protect people or property from floods.	
		U	The segment / system was built or is primarily used for channel alignment, navigation, recreation, fish and wildlife, land reclamation, drainage, to protect against land erosion or tidal inflows, or for some other non-flood related purpose.	
3. Segment / System Completion (A or U only)		**A**	Segment / System construction is fully completed.	
		U	The segment / system is still under construction.	
4. Construction Compliance (A or U only)		**A**	Appropriate local, State, tribal, and/or Federal permits (right-of-way, easements, regulatory permits, etc.), or waivers thereof, have been obtained for FDR segment / system construction and subsequent modifications. The segment / system was constructed in accordance with all applicable Federal, state and local codes, ordinances, and applicable laws.	
		U	The appropriate permits (or waivers thereof) have not been obtained for the segment / system, or the segment / system was not constructed in accordance with applicable codes, ordinances, and laws.	
5. Primary Levee		**A**	In the case of a levee segment / system, the levee is a primary levee or is a secondary levee which is designed to protect human life.	
		U	The levee is a secondary levee and was not designed to protect human life.	
		N/A	The FDR segment / system is not a levee segment / system.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Initial Eligibility

For use only during Initial Eligibility Inspections of Non-Federally Constructed Flood Damage Reduction Segments / Systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
6. Minimum Elevation[1] (A or U only)		**A**	• **Urban Levees and Floodwalls**- Minimum elevation corresponding to a flood level with 10% probability of occurring in a given year (10-year flood). • **Agricultural Levees and Floodwalls**- Minimum elevation corresponding to a flood level with 20% probability of occurring in a given year (5-year flood). • **Flood Damage Reduction Channels**- Minimum capacity is for a flood with a 10% probability of occurring in a given year (10-year flood). Improved channels must additionally provide drainage for at least 1.5 square miles of land and have a capacity of at least 800 cfs. (Interior drainage channels within the protected area of a levee segment / system are not considered to be flood damage reduction channels under the RIP.)	
		U	The FDR segment / system does not meet requirements for minimum elevation, capacity, or drainage area.	
7. Physical Location and Cross Section (A or U only)		**A**	The physical location, cross section, and other design elements of the FDR system are sufficient to provide reliable flood protection. The FDR segment / system forms a properly closed segment / system. See Table 5-4, EP 500-1-1.	
		U	The FDR segment / system was not constructed in an appropriate location, does not have an appropriate cross section, is not a properly closed segment / system, or has other shortcomings with design elements necessary for providing reliable flood damage reduction.	
8. Embankment Fill Material[2]		**A**	Embankment fill material is uniform and adequately compacted throughout the entire FDR segment / system, and the type of embankment material is suitable to prevent slides and seepage problems.	
		U	Embankment fill material is not uniform, or there is no compaction and evidence indicates a need for compaction, or the type of embankment material is unsuitable and is likely to contribute to the development of slides or seepage problems.	
9. Foundations[2]		**A**	Foundation material and construction methods adequately address piping, sand boils, seepage, or settlements that would reduce the level of protection.	
		U	Foundation material and construction methods are such that excessive uncontrolled seepage, sand boils, and piping will occur. Performance history indicates significant uncontrolled seepage, sand boils or piping.	
10. Erosion Control		**A**	Erosion protection is capable of handling the designed flow velocity for the level of protection for the entire FDR segment / system. The FDR segment / system is protected against bank caving and slides in all necessary areas, and has adequate drainage to protect FDR segment / system slopes from runoff erosion.	
		U	Erosion protection is not present and there is evidence indicating a need for erosion protection.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Initial Eligibility

For use only during Initial Eligibility Inspections of Non-Federally Constructed Flood Damage Reduction Segments / Systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
11. Interior Drainage System[3] (including culverts, gates, pump stations)		**A**	Given the level of protection provided by the FDR system, interior drainage structures are appropriately sized, situated, and constructed to move anticipated runoff and seepage out of the protected area. Pump stations will not become inundated during regular operation and their power system is adequately designed and reliable.	
		U	Interior drainage structures are undersized, poorly constructed, poorly situated, or unreliably designed.	
		N/A	The issue of interior drainage does not apply to this type of FDR segment / system.	
12. Structures[3]		**A**	Structures are designed and constructed to withstand anticipated loadings.	
		U	Structures are unreliably designed or inadequately constructed.	

[1] Depending on available data and local Corps policy, the minimum elevation required may be calculated using traditional methods, with the addition of 1 foot of freeboard in agricultural areas and 2 feet of freeboard in urban areas, or using annual exceedance probability, which numerically accounts for the natural variation and uncertainty when estimating discharge-probability and stage-discharge functions so that additional requirements for elevation are based on the level of uncertainty in the data.
[2] This item should be evaluated based on a review of performance history. If this is not available, some form of engineering assessment is required.
[3] Documentation (plans, at a minimum) required for any necessary engineering evaluation is to be provided by the public sponsor.

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

General Items for All Flood Damage Reduction Segments / Systems

For use during all inspections of all Flood Damage Reduction Segments / Systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Operations and Maintenance Manuals		**A**	Levee Owner's Manual, O&M Manuals, and/or manufacturer's operating instructions are present.	
		M	Sponsor manuals are lost or missing or out of date; however, sponsor will obtain manuals prior to next scheduled inspection.	
		U	Sponsor has not obtained lost or missing manuals identified during previous inspection.	
2. Emergency Supplies and Equipment (A or M only)		**A**	The sponsor maintains a stockpile of sandbags, shovels, and other flood fight supplies which will adequately supply all needs for the initial days of a flood fight. Sponsor determines required quantity of supplies after consulting with inspector.	
		M	The sponsor does not maintain an adequate supply of flood fighting materials as part of their preparedness activities.	
3. Flood Preparedness and Training (A or M only)		**A**	Sponsor has a written system-specific flood response plan and a solid understanding of how to operate, maintain, and staff the FDR system during a flood. Sponsor maintains a list of emergency contact information for appropriate personnel and other emergency response agencies.	
		M	The sponsor maintains a good working knowledge of flood response activities, but documentation of system-specific emergency procedures and emergency contact personnel is insufficient or out of date.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Unwanted Vegetation Growth[1]		**A**	The levee has little or no unwanted vegetation (trees, bush, or undesirable weeds), except for vegetation that is properly contained and/or situated on overbuilt sections, such that the mandatory 3-foot root-free zone is preserved around the levee profile. The levee has been recently mowed. The vegetation-free zone extends 15 feet from both the landside and riverside toes of the levee to the centerline of the tree. If the levee access easement doesn't extend to the described limits, then the vegetation-free zone must be maintained to the easement limits. Reference EM 1110-2-301 or Corps policy for regional vegetation variance.	
		M	Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the levee.	
		U	Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above and must to be removed to reestablish or ascertain levee integrity.	
2. Sod Cover		**A**	There is good coverage of sod over the levee.	
		M	Approximately 25% of the sod cover is missing or damaged over a significant portion or over significant portions of the levee embankment. This may be the result of over-grazing or feeding on the levee, unauthorized vehicular traffic, chemical or insect problems, or burning during inappropriate seasons.	
		U	Over 50% of the sod cover is missing or damaged over a significant portion or portions of the levee embankment.	
		N/A	Surface protection is provided by other means.	
3. Encroachments		**A**	No trash, debris, unauthorized farming activity, structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the levee.	
		M	Trash, debris, unauthorized farming activity, structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the levee.	
4. Closure Structures (Stop Log, Earthen Closures, Gates, or Sandbag		**A**	Closure structure in good repair. Placing equipment, stoplogs, and other materials are readily available at all times. Components are clearly marked and installation instructions/ procedures readily available. Trial erections have been accomplished in accordance with the O&M Manual.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
Closures) (A or U only)		**U**	Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.	
		N/A	There are no closure structures along this component of the FDR segment / system.	
5. Slope Stability		**A**	No slides, sloughs, tension cracking, slope depressions, or bulges are present.	
		M	Minor slope stability problems that do not pose an immediate threat to the levee embankment.	
		U	Major slope stability problems (ex. deep seated sliding) identified that must be repaired to reestablish the integrity of the levee embankment.	
6. Erosion/ Bank Caving		**A**	No erosion or bank caving is observed on the landward or riverward sides of the levee that might endanger its stability.	
		M	There are areas where minor erosion is occurring or has occurred on or near the levee embankment, but levee integrity is not threatened.	
		U	Erosion or caving is occurring or has occurred that threatens the stability and integrity of the levee. The erosion or caving has progressed into the levee section or into the extended footprint of the levee foundation and has compromised the levee foundation stability.	
7. Settlement[2]		**A**	No observed depressions in crown. Records exist and indicate no unexplained historical changes.	
		M	Minor irregularities that do not threaten integrity of levee. Records are incomplete or inclusive.	
		U	Obvious variations in elevation over significant reaches. No records exist or records indicate that design elevation is compromised.	
8. Depressions/ Rutting		**A**	There are scattered, shallow ruts, pot holes, or other depressions on the levee that are unrelated to levee settlement. The levee crown, embankments, and access road crowns are well established and drain properly without any ponded water.	
		M	There are some infrequent minor depressions less than 6 inches deep in the levee crown, embankment, or access roads that will pond water.	
		U	There are depressions greater than 6 inches deep that will pond water.	
9. Cracking		**A**	Minor longitudinal, transverse, or desiccation cracks with no vertical movement along the crack. No cracks extend continuously through the levee crest.	
		M	Longitudinal and/or transverse cracks up to 6 inches in depth with no vertical movement along the crack. No cracks extend continuously through the levee crest. Longitudinal cracks are no longer than the height of the levee.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	Cracks exceed 6 inches in depth. Longitudinal cracks are longer than the height of the levee and/or exhibit vertical movement along the crack. Transverse cracks extend through the entire levee width.	
10. Animal Control		**A**	Continuous animal burrow control program in place that includes the elimination of active burrowing and the filling in of existing burrows.	
		M	The existing animal burrow control program needs to be improved. Several burrows are present which may lead to seepage or slope stability problems, and they require immediate attention.	
		U	Animal burrow control program is not effective or is nonexistent. Significant maintenance is required to fill existing burrows, and the levee will not provide reliable flood protection until this maintenance is complete.	
11. Culverts/ Discharge Pipes[3] (This item includes both concrete and corrugated metal pipes.)		**A**	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
		N/A	There are no discharge pipes/ culverts.	
12. Riprap Revetments &		**A**	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	

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Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
Bank Protection		**M**	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
		N/A	There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.	
13. Revetments other than Riprap		**A**	Existing revetment protection is properly maintained, undamaged, and clearly visible.	
		M	Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.	
		N/A	There are no such revetments protecting this feature of the segment / system.	
14. Underseepage Relief Wells/ Toe Drainage Systems		**A**	Toe drainage systems and pressure relief wells necessary for maintaining FDR segment / system stability during high water functioned properly during the last flood event and no sediment is observed in horizontal system (if applicable). Nothing is observed which would indicate that the drainage systems won't function properly during the next flood, and maintenance records indicate regular cleaning. Wells have been pumped tested within the past 5 years and documentation is provided.	
		M	Toe drainage systems or pressure relief wells are damaged and may become clogged if they are not repaired. Maintenance records are incomplete or indicate irregular cleaning and pump testing.	
		U	Toe drainage systems or pressure relief wells necessary for maintaining FDR segment / system stability during flood events have fallen into disrepair or have become clogged. No maintenance records. No documentation of the required pump testing.	
		N/A	There are no relief wells/ toe drainage systems along this component of the FDR segment / system.	
15. Seepage		**A**	No evidence or history of unrepaired seepage, saturated areas, or boils.	
		M	Evidence or history of minor unrepaired seepage or small saturated areas at or beyond the landside toe but not on the landward slope of levee. No evidence of soil transport.	
		U	Evidence or history of active seepage, extensive saturated areas, or boils.	

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Levee Embankments

For use during Initial and Continuing Eligibility Inspections of levee segments / systems

[1] If there is significant growth on the levee that inhibits the inspection of animal burrows or other items, the inspection should be ended until this item is corrected.
[2] Detailed survey elevations are normally required during Periodic Inspections, and whenever there are obvious visual settlements.
[3] The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

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Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Unwanted Vegetation Growth[1]		**A**	A grass-only or paved zone is maintained on both sides of the floodwall, free of all trees, brush, and undesirable weeds. The vegetation-free zone extends 15 feet from both the land and riverside of the floodwall, at ground-level, to the centerline of the tree. Additionally, an 8-foot root-free zone is maintained around the entire structure, including the floodwall toe, heel, and any toe-drains. If the floodwall access easement doesn't extend to the described limits, then the vegetation-free zone must be maintained to the easement limits. Reference EM 1110-2-301 and/or Corps policy for regional vegetation variance.	
		M	Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the floodwall.	
		U	Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above. This vegetation threatens the operation or integrity of the floodwall and must be removed.	
2. Encroachments		**A**	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the floodwall.	
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the floodwall.	
3. Closure Structures (Stop Log Closures and Gates) (A or U only)		**A**	Closure structure in good repair. Placing equipment, stoplogs, and other materials are readily available at all times. Components are clearly marked and installation instructions/ procedures readily available. Trial erections have been accomplished in accordance with the O&M Manual.	
		U	Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.	
		N/A	There are no closure structures along this component of the FDR segment / system.	
4. Concrete Surfaces		**A**	Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	
		M	Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	

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Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
5. Tilting, Sliding or Settlement of Concrete Structures[2]		**A**	There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M	There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U	There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
6. Foundation of Concrete Structures[1]		**A**	No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M	There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. For the purposes of inspection, the erosion or scour is not closer to the riverside face of the wall than twice the floodwall's underground base width if the wall is of L-wall or T-wall construction; or if the wall is of sheetpile or I-wall construction, the erosion is not closer than twice the wall's visible height. Additionally, rate of erosion is such that the wall is expected to remain stabile until the next inspection.	
		U	Erosion or bank caving observed that is closer to the wall than the limits described above, or is outside these limits but may lead to structural instabilities before the next inspection. Additionally, if the floodwall is of I-wall or sheetpile construction, the foundation is unacceptable if any turf, soil or pavement material got washed away from the landside of the I-wall as the result of a previous overtopping event.	
7. Monolith Joints		**A**	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
		M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	

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Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A	There are no monolith joints in the floodwall.	
8. Underseepage Relief Wells/ Toe Drainage Systems		**A**	Toe drainage systems and pressure relief wells necessary for maintaining FDR segment / system stability during high water functioned properly during the last flood event and no sediment is observed in horizontal system (if applicable). Nothing is observed which would indicate that the drainage systems won't function properly during the next flood, and maintenance records indicate regular cleaning. Wells have been pumped tested within the past 5 years and documentation is provided.	
		M	Toe drainage systems or pressure relief wells are damaged and may become clogged if they are not repaired. Maintenance records are incomplete or indicate irregular cleaning and pump testing.	
		U	Toe drainage systems or pressure relief wells necessary for maintaining FDR segment / system stability during flood events have fallen into disrepair or have become clogged. No maintenance records. No documentation of the required pump testing.	
		N/A	There are no relief wells/ toe drainage systems along this component of the FDR segment / system.	
9. Seepage		**A**	No evidence or history of unrepaired seepage, saturated areas, or boils.	
		M	Evidence or history of minor unrepaired seepage or small saturated areas at or beyond the landside toe but not on the landward slope of levee. No evidence of soil transport.	
		U	Evidence or history of active seepage, extensive saturated areas, or boils.	

[1] Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.
[2] The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Vegetation and Obstructions		**A**	No obstructions, vegetation, debris, or sediment accumulation noted within interior drainage channels or blocking the culverts, inlets, or discharge areas. Concrete joints and weep holes are free of grass and weeds.	
		M	Obstructions, vegetation, debris, or sediment are minor and have not impaired channel flow capacity or blocked more than 10% of any culvert openings, but should be removed. A limited volume of grass and weeds may be present in concrete channel joints and weep holes.	
		U	Obstructions, vegetation, debris, or sediment have impaired the channel flow capacity or blocked more than 10% of a culvert opening. Sediment and debris removal required to re-establish flow capacity.	
2. Encroachments		**A**	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the interior drainage system.	
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of this component of the interior drainage system.	
3. Ponding Areas		**A**	No trash, debris, structures, or other obstructions present within the ponding areas. Sediment deposits do not exceed 10% of capacity.	
		M	Trash, debris, excavations, structures, or other obstructions present, or inappropriate activities that will not inhibit operations and maintenance. Sediment deposits do not exceed 30% of capacity.	
		U	Trash, debris, excavations, structures, or other obstructions, or other encroachments or activities noted that will inhibit operations, maintenance, or emergency work. Sediment deposits exceeds 30% of capacity.	
		N/A	There are no ponding areas associated with the interior drainage system.	
4. Fencing and Gates[1]		**A**	Fencing is in good condition and provides protection against falling or unauthorized access. Gates open and close freely, locks are in place, and there is little corrosion on metal parts.	
		M	Fencing or gates are damaged or corroded but appear to be maintainable. Locks may be missing or damaged.	
		U	Fencing and gates are damaged or corroded to the point that replacement is required, or potentially dangerous features are not secured.	
		N/A	There are no features noted that require safety fencing.	
5. Concrete Surfaces (Such as gate		**A**	Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	

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Interior Drainage System

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Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
wells, outfalls, intakes, or culverts)		**M**	Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	
		U	Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
		N/A	There are no concrete items in the interior drainage system.	
6. Tilting, Sliding or Settlement of Concrete and Sheet Pile Structures[2] (Such as gate wells, outfalls, intakes, or culverts)		**A**	There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M	There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U	There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
		N/A	There are no concrete items in the interior drainage system.	
7. Foundation of Concrete Structures[3] (Such as culverts, inlet and discharge structures, or gatewells.)		**A**	No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M	There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. The rate of erosion is such that the structure is expected to remain stabile until the next inspection.	
		U	Erosion or bank caving observed that may lead to structural instabilities before the next inspection.	
		N/A	There are no concrete items in the interior drainage system.	
8. Monolith Joints		**A**	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
		M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A	There are no monolith joints in the interior drainage system.	
9. Culverts/ Discharge Pipes[4]		**A**	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods within the past five years, and reports for all pipes are not available for review by the inspector.	
		N/A	There are no discharge pipes/ culverts.	
10. Sluice / Slide Gates[5]		**A**	Gates open and close freely to a tight seal or minor leakage. Gate operators are in good working condition and are properly maintained. Sill is free of sediment and other obstructions. Gates and lifters have been maintained and are free of corrosion. Documentation provided during the inspection.	
		M	Gates and/or operators have been damaged or have minor corrosion, and open and close with resistance or binding. Leakage quantity is controllable, but maintenance is required. Sill is free of sediment and other obstructions.	
		U	Gates do not open or close and/or operators do not function. Gate, stem, lifter and/or guides may be damaged or have major corrosion.	
		N/A	There are no sluice/ slide gates.	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
11. Flap Gates/ Flap Valves/ Pinch Valves[1]		**A**	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	
		M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
		U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
		N/A	There are no flap gates.	
12. Trash Racks (non-mechanical)		**A**	Trash racks are fastened in place and properly maintained.	
		M	Trash racks are in place but are unfastened or have bent bars that allow debris to enter into the pipe or pump station, bars are corroded to the point that up to 10% of the sectional area may be lost. Repair or replacement is required.	
		U	Trash racks are missing or damaged to the extent that they are no longer functional and must be replaced. (For example, more than 10% of the sectional area may be lost.)	
		N/A	There are no trash racks, or they are covered in the pump stations section of the report.	
13. Other Metallic Items		**A**	All metal parts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.	
		M	Corrosion seen on metallic parts appears to be maintainable.	
		U	Metallic parts are severely corroded and require replacement to prevent failure, equipment damage, or safety issues.	
		N/A	There are no other significant metallic items.	
14. Riprap Revetments of Inlet/ Discharge Areas		**A**	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
		N/A	There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.	
15. Revetments other than Riprap		**A**	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
		N/A	There are no such revetments protecting this feature of the segment / system.	

[1] Proper operation of this item must be demonstrated during the inspection.
[2] The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.
[3] Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.
[4] The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.
[5] Proper operation of the gates (full open and closed) must be demonstrated during the inspection if no documentation is available. Be aware of both manual and electrical operators.

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Pump Stations

For use during Initial and Continuing Eligibility Inspections of pump stations

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Pump Stations Operating, Maintenance, Training, & Inspection Records		**A**	Operation, maintenance and inspection records are present at the pump station and are being used and updated, and personnel have been trained in pump station operations. Names and last training date shown in the record book.	
		M	Operation, maintenance and inspection records are present but not adequately used and updated.	
		U	No operation, maintenance and inspection records are present, or refresher training for personnel has not been conducted.	
2. Pump Station Operations and Maintenance Equipment Manuals		**A**	Operation and Maintenance Equipment Manuals and/or posted operating instructions are present and updated as required, and adequately cover all pertinent pump station features. O&M manuals include points of contact for manufacturers and suppliers of major equipment used in the facility.	
		M	Operation and Maintenance Equipment Manuals and/or posted operating instructions are present and adequately cover all pertinent pump station features. However, they are incomplete and the necessary updates have not been made.	
		U	Operation and Maintenance Equipment Manuals are not available.	
3. Safety Compliance		**A**	Safety compliance inspection reports by applicable local, state, or federal agencies available for review.	
		M	No safety compliance inspection reports are available for review.	
4. Communications (A or M only)		**A**	A telephone, cellular phone, two-way radio, or similar device is available to pump station operator and maintenance personnel.	
		M	A telephone, cellular phone, two-way radio, or similar device is not available to pump station operator and maintenance personnel.	
5. Plant Building		**A**	The building is in good structural condition with no major foundation settlement problems. The roof is not leaking, intake & exhaust louvers are clear of debris, fans are operational, etc.	
		M	There are minor structural defects, minimal foundation settlement, leaks, or other conditions noted that need repair. Defects do not threaten the structural integrity or stability of the building, and will not impact pumping operations.	
		U	The structural integrity or stability of the building is threatened, or there is damage to the building that threatens safety of the operator or impacts pumping operations.	
6. Fencing and Gates[1]		**A**	Fencing is in good condition and provides protection against falling or unauthorized access. Gates open and close freely, locks are in place, and there is little corrosion on metal parts.	
		M	Fencing or gates are damaged or corroded but appear to be maintainable. Locks may be missing or damaged.	
		U	Fencing and gates are damaged or corroded to the point that replacement is required, or potentially dangerous features are not secured.	

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Pump Stations

For use during Initial and Continuing Eligibility Inspections of pump stations

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		N/A	There are no features noted that require safety fencing.	
7. Pumps[1]		**A**	All pumps are properly maintained and lubricated. Systems are periodically tested and documented for review. No vibration, cavitation noises or unusual sounds are noted when the pump is operated. Bearing temperature sensor records don't indicate any problems.	
		M	Minor deficiencies noted that need to be closely monitored or repaired, such as the presence of slight vibrations, leakage of packing gland, bearing temperature sensors are inoperable or no record is present. However, the pumps are operational and are expected to perform through the next period of usage.	
		U	Major deficiencies identified that may significantly reduce pumping operations. For example, bearing sensor records indicate problems, excessive vibration noted, impellers are badly corroded, or there are eroded or missing blades.	
8. Motors, Engines, Fans, Gear Reducers, Back Stop Devices, etc.		**A**	All items are operational. Preventative maintenance and lubrication is being performed and the system is periodically subjected to performance testing. Instrumentation, alarms, bearing sensors and auto shutdowns are operational.	
		M	Systems have minor deficiencies, but are operational and will function adequately through the next flood. Bearing sensors are not operational.	
		U	One or more of the primary motors or systems is not operational, or noted deficiencies have not been corrected.	
9. Sumps / Wet well		**A**	Clear of debris, sediment, or other obstructions. Procedures are in place to remove debris accumulation during operation.	
		M	Debris, sediment, or other obstructions may be present and must be removed, but the sump/ wet well will function as intended during the next flood. Procedures are in place to remove debris accumulation during operation.	
		U	Large debris or excessive silt present which will hinder or damage pumps during operation, or no procedures established to remove debris accumulation during operation.	
10. Mechanical Operating Trash Rakes[1]		**A**	Drive chain, bearing, gear reducers, and other components are in good operating condition and are being properly maintained.	
		M	The trash rake is in need of maintenance, but is still operational.	
		U	Trash rake not operational or deficiencies will inhibit operations during the next flood event.	
		N/A	There are no mechanical trash rakes.	
11. Non-Mechanical Trash Racks		**A**	Trash racks are fastened in place and properly maintained.	
		M	Trash racks are in place but are unfastened or have bent bars that allow debris to enter into the pipe or pump station, bars are corroded to the point that up to 10% of the sectional area may be lost. Repair or replacement is required.	

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Pump Stations

For use during Initial and Continuing Eligibility Inspections of pump stations

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	Trash racks are missing or damaged to the extent that they are no longer functional and must be replaced. (For example, more than 10% of the sectional area may be lost.)	
		N/A	There are no trash racks, or they are covered in the pump stations section of the report.	
12. Fuel System for Pump Engines		**A**	Fuel system is operational, day tank present and operational, fuel fresh and rotated regularly.	
		M	Fuel system is operational and of adequate capacity, but day tank is missing or fuel is not fresh and rotated regularly.	
		U	Fuel system not functional.	
		N/A	No fuel system.	
13. Power Source		**A**	The normal power source and backup generators, if installed, are operational, properly exercised and well maintained. Surge protection, grounding, lightning protection, transformers, and automatic/manual transfer of main power to backup system is working.	
		M	Normal power source and backup units, if applicable, are operational with minor discrepancies or maintenance, inspection and exercising record is present but not up to date. Preventative maintenance or repairs are required.	
		U	Normal power source or generators are not operational and must be repaired; or generator, if required, is not on site.	
14. Electrical Systems[2]		**A**	Operational and maintained free of damage, corrosion, and debris. Preventative maintenance and system testing is being performed periodically.	
		M	Operational with minor discrepancies. Preventative maintenance or repairs are required, but the components are expected to function adequately during the next flood event.	
		U	Components of the electrical system will not function adequately during the next flood event and must be replaced.	
15. Megger Testing on Pump Motors and Critical Power Cables		**A**	Results of megger tests on pump motors or critical power cables show that the insulation meets manufacturer's or industry standards. Tested within the last year.	
		M	Megger testing not conducted within the past year. If megger tests on pump motors indicate that insulation resistance is below the manufacturer's or industry standard, but the resistance can be corrected with proper application of heat, this is minimally acceptable. (The application of heat does not relate to critical power cables.)	
		U	Megger tests not conducted within past two years, or tests indicate that insulation resistance is low enough that the equipment will not be able to meet design standards of operation; or evidence of arcing or shorting is detected visually.	

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Pump Stations

For use during Initial and Continuing Eligibility Inspections of pump stations

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
16. Enclosures, Panels, Conduit and Ducts		**A**	All enclosures, panels, conduits, and ducts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.	
		M	Minor surface corrosion which appears to be maintainable. Cleaning and painting required.	
		U	Severely corroded and must be replaced to prevent failure, equipment damage, or safety issues.	
17. Intake and Discharge Pipelines		**A**	Intake and discharge pipelines have no corrosion and paint is intact, except for minor touch up required. Pipe couplings and anchors have no leakage or corrosion.	
		M	Intake and discharge pipelines have minor corrosion and repair and painting is required. Pipe coupling with anchors have minor leakage, corrosion and require bolts to be tightened.	
		U	Intake and discharge pipelines have major corrosion and replacement is required. Pipe coupling with anchors have major leakage and is heavily corroded and requires replacement.	
18. Sluice/ Slide Gates[3]		**A**	Gates open and close freely to a tight seal or minor leakage. Gate operators are in good working condition and are properly maintained. Sill is free of sediment and other obstructions. Gates and lifters have been maintained and are free of corrosion. Documentation provided during the inspection.	
		M	Gates and/or operators have been damaged or have minor corrosion, and open and close with resistance or binding. Leakage quantity is controllable, but maintenance is required. Sill is free of sediment and other obstructions.	
		U	Gates do not open or close and/or operators do not function. Gate, stem, lifter and/or guides may be damaged or have major corrosion.	
		N/A	There are no sluice/ slide gates.	
19. Flap Gates/ Flap Valves/ Pinch Valves[1]		**A**	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	
		M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
		U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
		N/A	There are no gates on discharge lines from pump station.	
20. Cranes[1]		**A**	Cranes operational and have been inspected and load tested in accordance with applicable standards within the last year. Documentation is on hand.	

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Pump Stations

For use during Initial and Continuing Eligibility Inspections of pump stations

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		M	Cranes have not been inspected or operationally tested within the past year, or there are visible signs of corrosion, oil leakage, etc, requiring maintenance.	
		U	Cranes are not operational, and this may prevent the pump station from functioning as required. No documentation available on cranes.	
		N/A	There are no cranes.	
21. Other Metallic Items (Equipment, Ladders, Platform Anchors, etc)		**A**	All metal parts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.	
		M	Corrosion seen on metallic parts appears to be maintainable.	
		U	Metallic parts are severely corroded and require replacement to prevent failure, equipment damage, or safety issues.	
		N/A	There are no other significant metallic items.	

[1] Proper operation of this item must be demonstrated during the inspection.
[2] Check motor control center, circuit breakers, pilot lights, volt meters, ammeters, sump level indicator, gate position indicators, remote operating systems, including SCADA and telemetry systems. Also, check interior and exterior lighting; especially lighting near trash rack screens, ladders, walkways, etc.
[3] Proper operation of the gates (full open and closed) must be demonstrated during the inspection if no documentation is available. Be aware of both manual and electrical operators.

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Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
1. Vegetation and Obstructions		**A**	No obstructions, vegetation, debris, or sediment accumulation within the channel. Concrete channel joints and weep holes are free of grass and weeds.	
		M	Obstructions (including log jams), vegetation, debris, or sediment are minor and have not impaired channel flow capacity, but should be removed. Sediment shoals have not developed to the extent that they can support vegetation other than non-aquatic grasses. A limited volume of grass and weeds may be present in concrete channel joints and weep holes.	
		U	Obstructions (including log jams), vegetation, debris or sediment have impaired the channel flow capacity. Sediment shoals are well established and support woody and/or brushy vegetation. Sediment and debris removal required to re-establish flow capacity.	
2. Shoaling[1] (sediment deposition)		**A**	No shoaling or minor, non-vegetated shoaling is present.	
		M	More widespread vegetated and non-vegetated shoaling is present. Non-aquatic grasses are present on shoal. No trees or brush is present on shoal, and channel flow is not significantly reduced. Sediment and debris removal recommended.	
		U	Shoaling is well established, stabilized by saplings, brush, or other vegetation. Shoals are diverting flow to channel walls. Channel flow capacity is reduced and maintenance is required.	
3. Encroachments		**A**	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the channel.	
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the channel.	
4. Erosion		**A**	No head cutting or horizontal deviation observed.	
		M	Head cutting and horizontal deviation evident, but is less than 1 foot from the designed grade or cross section.	
		U	Head cutting and horizontal deviation of more than 1 foot from the designed grade or cross section. Corrective actions required to stop or slow erosion.	
5. Concrete Surfaces		**A**	Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	
		M	Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	

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Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		U	Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
		N/A	There are no concrete items in the channel.	
6. Tilting, Sliding or Settlement of Concrete Structures[2]		**A**	There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M	There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U	There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
		N/A	There are no concrete items in the channel.	
7. Foundation of Concrete Structures[3]		**A**	No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M	There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. For the purposes of inspection, the erosion or scour is not closer to the riverside face of the wall than twice the floodwall's underground base width if the wall is of L-wall or T-wall construction; or if the wall is of sheetpile or I-wall construction, the erosion is not closer than twice the wall's visible height. Additionally, rate of erosion is such that the wall is expected to remain stabile until the next inspection.	
		U	Erosion or bank caving observed that is closer to the wall than the limits described above, or is outside these limits but may lead to structural instabilities before the next inspection. Additionally, if the floodwall is of I-wall or sheetpile construction, the foundation is unacceptable if any turf, soil or pavement material got washed away from the landside of the I-wall as the result of a previous overtopping event.	
		N/A	There are no concrete items in the channel.	
8. Slab and Monolith Joints		**A**	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	

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Rated Item	Rating	Rating Guidelines		Location/Remarks/Recommendations
		M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
		U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A	There are no concrete items in the channel.	
9. Flap Gates/ Flap Valves/ Pinch Valves[4]		**A**	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	
		M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
		U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
		N/A	There are no flap gates.	
10. Riprap Revetments & Banks		**A**	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	
		N/A	There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.	
11. Revetments other than Riprap		**A**	Existing revetment protection is properly maintained, undamaged, and clearly visible.	
		M	Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U	Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.	
		N/A	There are no such revetments protecting this feature of the segment / system.	

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Flood Damage Reduction Channels

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[1] If weather and flow conditions allow, inspectors should walk in the channel and probe shoal areas in order to estimate extent of blockage of the cross-sectional area where shoaling is present.
[2] The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.
[3] Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.
[4] Proper operation of this item must be demonstrated during the inspection.

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Flood Damage Reduction Segment / System
Supplemental Data Sheet

This form is intended for the Corps' internal use and may not need to be updated with every inspection.

Name of Segment / System:
Sponsor:
Location:
River Basin:
Project Description:
Authority that Project was Constructed Under:
Date of Construction:
Approximate Annual Maintenance Costs:

Construction: ☐ Federally Constructed ☐ Non-Federally Constructed

Maintenance: ☐ Federally Maintained ☐ Non-Federally Maintained

National Flood Insurance Program:

a. Is the project currently NFIP? ☐ Yes ☐ No
b. If in the NFIP, Date of Certification (per 44 CFR 65.10):

Datum Information:

a. Datum used for the design and construction of this project is:
b. Current recommended datum for this project is:
c. Has the Project been converted to the current recommended datum? ☐ Yes ☐ No

Levee Embankment Data:

a. Levee Designed Gage Function Reading/Station:
b. Level of Protection Provided:
c. Average Height of Levee:
d. Average Crown Width:
e. Average Side Slope:

Protected Features (For use in preparing estimates and PIRs):

a. Total acres protected:
b. Total agriculture production acres protected:
c. Towns:
d. Businesses:
e. Residences:
f. Roads:
g. Utilities:
h. Barns:
i. Machine Sheds:
j. Outbuildings:
k. Irrigation Systems:
l. Grain Bins:
m. Other Facilities: