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ENGINEERING INSTRUCTION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

REGIONAL OFFICES

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SUBJECT: Procedure for Bridge
Reconstruction Projects

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APPROVED:

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Supersedes:

Attached is a copy of a Procedure for Bridge Reconstruction Projects along with Attachment 1 (sample of a field inspection report) and Attachment 2 (flow chart).

This procedure will be effective immediately.

PROCEDURE FOR BRIDGE RECONSTRUCTION PROJECTS

This procedure is written to clarify and expedite the processing of Bridge Reconstruction Projects. There is a large variation in the extent, complexity and cost of different bridge reconstruction projects as opposed to the relatively standardized new structure. One project may include only replacing several bearings; another might include placing a new deck, painting structural steel, replacing a pier and repairing concrete abutments. For this reason, the Procedure may be more detailed than necessary in some cases, and perhaps less detailed than necessary in other cases. It is not intended that all the items on the Preliminary Check and Review List will apply to a relatively simple reconstruction projects. To do so would needlessly extend the time between project initiation and P.S. & E. submission and make unnecessary work for Department personnel.

I The Deputy Chief Engineer (Structures) will select and assign the project to either the Bureau of Structural Design and Review or to the Regional Office after the Bridge R & P Program is set for the new fiscal year and after consultation with the Bridge Design Section Supervisor and the Regional Design Engineer.

A. The Bridge Design Section Supervisor will assign the project to the Design Squad Supervisor.

B. The Regional Director will assign the project to the Regional Structures Engineer or to a Regional Highway Design Unit. The Deputy Chief Engineer (Structures) will be advised as to the unit assigned the responsibility for the project. Correspondence to the Deputy Chief Engineer (Structures) shall be through the Regional Structures Engineer regardless of where the project is assigned.

II The Designer (Design Squad Supervisor, Regional Structures Engineer or Regional Highway Design Unit) shall obtain the following:

a. The latest General Bridge Inspection and Condition Report (Form TP 172-3C) and the original contract number, if available, from the Special Design Unit (Structures).

b. The plans of the existing bridge in the following manner:

1. State Highway Bridges - Plan Files Unit of the Final Plan Review Bureau or Region Plan Files Unit.

2. Canal Bridges - Waterways Maintenance Subdivision (Main Office or Regional Office).

3. Railroad Bridges - The Railroad, through the Railroad Section (Structures).

4. Other Bridges - The Shop Drawing and Fabrication Unit (Structures), steel fabricator, consulting engineer, contractor, county, or any other available source.

III The Regional Office shall supply to the Designer the following information which is necessary to obtain Federal Aid:

- a. The Regional Planning Group shall supply current traffic and projected traffic (20 years, or as specified).
- b. A statement from the Regional Planning Group about proposed improvements to this section of the highway. Ordinarily the statement from the Planning Group will say that there are no plans in the foreseeable future. If there are plans, the Region must justify why the bridge is being reconstructed at this time.
- c. A method for maintaining traffic: This must be done in coordination with the Designer, usually as the preliminary plan evolves. The Region will discuss the project with State and local police and with local officials, including school boards and fire companies. Some of this discussion may have to take place during the preparation of the Preliminary Plan.
- d. A Hydraulic Report on stream bridges where there is evidence of insufficient waterway area or scour.
- e. In a few cases where substructures have settled or are extensively deteriorated, borings, a Foundation Investigation Report and Foundation Design Requirements must be obtained. This should be handled through the Foundations Construction Unit (Structures).

IV The Design Squad Supervisor, Regional Structures Engineer or the Regional Highway Design Unit will make a field inspection of the bridge with the presence of the Regional Bridge Maintenance Engineer optional. A Field Inspection Report will be made by the Designer. The report will include a brief description of the existing bridge including pictures and sketches followed by two parts, observations and recommendations, both of which should be itemized. A sample report is included. See attachment 1.

V If cores of the structural slab have not been taken, they will be requested through the Special Design Unit (Structures), unless it is obvious as supported by specific observations, that the slab should be replaced. However, for Federal Aid, some cores or photographic documentation should be made for the record. The field inspection may suggest that cores be taken at other locations as well.

VI The Designer prepares the Bridge Reconstruction Project Report which will include the following when appropriate:

- a. Location Map
- b. Field Inspection Report
- c. Statement from the Planning Group
- d. Core analysis, including photographs
- e. Current and projected traffic
- f. Hydraulic Report
- g. Foundation Design Requirements
- h. Traffic Maintenance Plan and Cost
- i. Overall Recommendations and Conclusions including a cost comparison between reconstruction and replacement

VII If the Field Inspection Report, cores, hydraulics, etc. indicate the structural condition to be other than was supposed at the initial decision time or if there is a marked increase in cost, the Bridge Reconstruction Project Report will be forwarded to the Deputy Chief Engineer (Structures) for his reassessment and decision. If it is decided to replace the structure, he will recommend to the Region that they submit a scope change and reschedule the project.

VIII If the original decision to reconstruct is unchanged, then the Designer will prepare the Preliminary Plan using the attached outline and check list. This Preliminary Plan shall be prepared in accordance with current standard details for highway bridges, BDD and BR Sheets.

IX The Negative Declaration, if Federal Aid is being requested, will be prepared by the Designer as the Preliminary Plan is being finalized. The Negative Declaration must satisfy the requirements of IM 20-4-72 (Guidelines for Consideration of Economic, Social, and Environmental Effects (PPM 20-8 modified) and PPM 90-2 (Noise Standards and Procedures). If the bridge is over a stream, the Declaration will briefly relate the long and short term effects on the stream. Any material change to the outward appearance of the structure will be included in the Declaration.

Incorporate the following statement in the Negative Declarations:
"Since this project is a bridge reconstruction and is unrelated to increased traffic noise levels, we believe it is exempt from the noise standards of PPM 90-2 (Noise Standards and Procedures)."

- X The Designer will prepare a package which consists of the following:
1. The original Preliminary Plan and two prints.
 2. The Preliminary Check and Review List.
 3. The Bridge Reconstruction Project Report (described in VI).
 4. The Negative Declaration.

- A. The Project Engineer will submit the package to the Supervisor of the Bridge Design Section. After his review, he will forward the package to the Deputy Chief Engineer (Structures) for his signature. One sepia and two prints of the approved Preliminary Plan will be forwarded to the Regional Office for its review and comments.
- B. The Regional Structures Engineer will submit the package to the Deputy Chief Engineer (Structures) for review by the Plan Review Unit (Structures). If the Regional Highway Design Unit prepares the package, the package will be transmitted to the Regional Structures Engineer for submission as above. After review, the unit supervisor will forward the package to the Deputy Chief Engineer (Structures) for his signature. The Plan Review Unit Supervisor shall return to the Regional Office the approved original Preliminary Plan and one print showing any corrections to be made to the original.

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The Deputy Chief Engineer (Structures) will forward one copy of the Preliminary Plan and the Negative Declaration for all projects over water to the Department of Environmental Conservation.

XII The Project Engineer or the Plan Review Unit Supervisor will forward three prints of the approved Preliminary Plan for all projects involving a railroad to the Railroad Section (Structures) for distribution.

XIII If Federal Aid is requested, the Plan Review Unit (Structures) will submit the package, minus the check list, to the FHWA for other than secondary projects and to the Preliminary Plan Review Bureau for secondary projects, requesting design approval. Copies of the submission memorandum will go to the Capital Projects Coordination Bureau and to the Region. A postscript on the Region's copy will instruct the Region to advertise the Request for Design Approval.

When design approval is received, the Planning and Programming Unit (Structures) will notify the Capital Projects Coordinating Bureau, the Final Plan Review Bureau and the Region, instructing the Region to publish the Notice of Design Approval. The Planning and Programming Unit (Structures) will also send copies of the approved Negative Declaration to the same three agencies.

XIV The Designer will prepare the advance structure plans. Advance structure plans show essential details, are unchecked, contain no bar lists and contain the table "Estimate of Quantities" but no amounts.

XV The Regional Office will prepare the P.S. & E. for any necessary approach work or for any work portion beyond the reinforced approach slab. It will also prepare the Maintenance and Protection of Traffic items and the title sheet for the plans. When the structure plans are prepared by the Bridge Design Section, two sets of the advance highway plans will be forwarded to them for their review. One set will be returned to the Regional Office with comments.

- XVI A. The Project Engineer distributes the advance structure plans as follows:
1. One sepia and two prints for the Regional Office.
 2. One for Plan Review Unit (Structures).
 3. One for FHWA, if Federal Aid is to be requested.
 4. Three for each railroad, if involved, through the Railroad Section (Structures).
 5. Two for Waterways Maintenance Subdivision, if involved.
- B. The Regional Structures Engineer will forward the advance structure plans to the Plan Review Unit (Structures). If the Regional Highway Design Unit prepares the plans, they will submit them to the Regional Structures Engineer for submission as above. The Plan Review Unit (Structures) will require and distribute the number of plans as follows:
1. Two for Plan Review Unit (Structures).
 2. One for FHWA if Federal Aid is to be requested.
 3. Three for each railroad, if involved, through the Railroad Section (Structures).
 4. Two for Waterways Maintenance Subdivision, if involved.
- XVII A. The Design Squad Supervisor will finalize the structure plans incorporating the appropriate comments from the Regional Office, Railroad, Waterways, FHWA, Department of Environmental Conservation, utility owners, Plan Review Unit (Structures), etc.; and forward the structure P.S. & E. to the Region. The Regional Office will prepare the Report on Design and combine the structure plans with the plans prepared by the Regional Office. In conformance with the current Engineering Instruction titled "Final P.S. & E. Submission" and the Tentative Letting as submitted by the Capital Projects Coordination Bureau, the Regional Office will forward the combined P.S. & E. to the Final Plan Review Bureau.
- B. The Regional Structures Engineer will prepare the Report on Design and finalize the structure and approach plans incorporating the appropriate comments from the Plan Review Unit (Structures), Railroad, Waterways, etc., or when the Regional Highway Design Unit does the design, they will do this work. The Regional Office will combine the structure plans and approach plans. In conformance with the current Engineering Instruction titled "Final P.S. & E. Submission" and the Tentative Letting as submitted by the Capital Projects Coordination Bureau, the Regional Office will forward the combined P.S. & E. to the Final Plan Review Bureau.

For flow chart covering the above activities, see attachment 2.

LOCATION MAP

LOCATIONS TO BE RELOCATED TO THIS SHEET
for final P.S.E.)

FOR INFORMATION
LIST

(To be removed for
final P.S. & E.)

D-BRIDGE
APPROACH
SECTION

E-HIGHWAY
SECTION

F-ROAD
UNDER
OR
CHANNEL
SECTION

C
BRIDGE
CROSS
SECTIONS

A-PLAN

B-ELEVATION

G-FLAG PROFILE
OF BRIDGE

H-FLAG PROFILE
OF ROAD UNDER
OR CHANNEL

RECONSTRUCTION PRELIMINARY SHEET CHECK AND REVIEW LIST

NOTE: Designer Use ✓ - after detailing an item on check list.

NA - if item is not applicable.

Reviewer Use (Red)✓/- next to designer's mark.

A. Plan (Shows reconstruction generally, however, existing conditions may be shown if needed for clarity) (includes the following):

- Scale 10-50 feet per inch
- Bridge centerline stationing, left to right
- Centerline of feature beneath the bridge
- North Arrow
- Station equality
- Approach Slab
- Pressure relief joints
- Light poles
- Slope lines
- Names of roads
- Scuppers
- Curve data, horizontal
- Utilities
- Skew
- Centerline bearings
- Bridge joints, show type
- Signs on structure
- Adjacent topography
- Theoretical grade lines
- Bridge begin and end stations
- Abutments
- Piers
- Bridge curbs
- Bridge pavement lanes
- Superstructure
- Bridge railing
- Approach railing
- Approach pavement lanes
- Approach shoulders
- Ditches
- Slope lines
- Direction of channel flow
- Slope protection
- Span lengths

BIN over title

B. Elevation (directly under and projected down from plan)
(includes the following):

Scale, same as plan
Bridge Railing
Approach railing
Superstructure
Abutments
Piers
Slope protection
Light poles
Foundation Treatment, if applicable
Sod gutters
Bearings, fixed and expansion
Span lengths
Actual Minimum vertical clearance
Road section beneath bridge

NOTE: For C, D, E and F, the following shall apply:

1. Scale 10 feet per inch, or as necessary.
2. If symmetrical, show existing left of centerline and proposed right of centerline.
3. If unsymmetrical, show complete existing and complete proposed sections.

C. Bridge Cross Section (show a section for each different type of bridge section) (includes the following):

Removal items
New items
Cross slope
Curb type
Curb height
Centerline of structure
Sidewalk dimensions
Lane dimensions
Out-to-Out dimensions
Stringer spacing
Type of railing
Pavement type and thickness
Deck thickness
Theoretical grade lines

D. Bridge Approach Section (includes the following):

- Removal items
- New items
- Centerline
- Lane dimensions
- Shoulder dimensions, type and thickness
- Railing type
- Cross slope
- Side slope
- Theoretical grade line
- Pavement type
- Subsurface layers, type and thickness
- Curb type
- Gutters

E. Highway Section (highway section shall be beyond the 50' approach section; the Regional Office shall indicate the removal items and new items on the highway section) (includes the following):

- New items
- Centerline
- Lane dimensions
- Shoulder dimensions
- Curb dimensions
- Mall dimensions
- Removal items
- Pavement slope
- Shoulder slope
- Side slope
- Slope protection
- Curb type

F. Road Under or Channel Section (the Regional Office shall indicate the new items on the road under section or channel section)

Road Under (includes the following):

- Removal items
- New items
- Centerline
- Lane dimensions
- Shoulder dimensions
- Curb dimensions
- Mall dimensions
- Pavement slope
- Shoulder slope
- Side slope
- Slope protection

Guide Rail Protection

Channel Section (includes the following, if required):

- Removal items
- New items
- Centerline
- Slope protection (stone fill)
- Dish dimensions
- Side slope
- Channel dimensions

G. Flag Profile of Bridge (no scale, no datum, exaggerate grades, flags at one or two PVI's in vicinity of bridge, show both existing and proposed flag profiles if they differ) (includes the following):

- Station PVI
- Elevation PVI
- Vertical curve length
- Stopping sight distance
- Grades
- Middle ordinate

H. Flag Profile of Road Under or Channel (no scale, no datum, flag at one PVI) (includes the following):

- Station PVI
- Elevation PVI
- Middle ordinate
- Vertical curve length
- Grades

I INFORMATION LIST

1. Work to be done: Itemize all work to be done, including removal and replacement of deck, superstructure and substructure and in that order and refer to this work by the appropriate payment item numbers. Show a suggested method of maintaining traffic.
2. Notes to Regional Office (when Preliminary is made by Structures Design and Construction Subdivision).
 - R1. Regional Office shall review all dimensions and details on this preliminary.
 - R2. Regional Office shall prepare Plans, Specifications and Estimate for the Maintenance and Protection of Traffic, including detour layout, signing and signal devices.
 - R3. Regional Office shall indicate removal items and new items on Highway Section and on Road Under or Channel Section.
 - R4. Regional Office shall prepare P.S. & E. for all highway work beyond, below and adjacent to the bridge approach slabs.
 - R5. Regional Office shall indicate pay limits of approach guide rail removal and replacement, either on this plan or separate plan of their P.S. & E. submission.
 - R6. Regional Office shall list all items to be used on approaches.
 - R7. Bridge Data Sheet, Part 2, Waterway Supplement Sheet shall be done by the Regional Office for a Stream bridge. See Hydraulic Report, IIId, of Procedure.
 - R8. The Regional Office shall include pressure relief joints, if required, in their P.S. & E. submission.
 - R9. The Regional Office shall indicate the station and offset of driveway railing terminals on all applicable corners of the plan on the preliminary.
3. Questions for Regional Office (when Preliminary Plan is done by Structures Design and Construction Subdivision)
 - Q1. Is pedestrian traffic to be maintained?
 - Q2. Can traffic be detoured?
 - Q3. Will one-way traffic or two-way traffic be maintained?
 - Q4. Does the Regional Office desire salvage of any materials? (If yes, send justification.)
 - Q5. What is the exact dimensions and location of utilities; are they still required, and, if so, are they sufficient or are more needed?

Q6. The Regional Structures Engineer shall advise the Utility Engineer of the project. Applicable reports shall be forwarded to the Main Office Utilities Engineer. Refer to Rules and Regulations governing the accommodation of utilities within the State highway right-of-way, refiled 1974.

Q7. What dates did the Regional Office contact the utility companies?

Q8. What channel work is to be done?

4. Notes to Designer

D1. The location of the jacking points and the reactions shall be shown on the advance plans.

D2. The maximum allowable differential movement between adjoining stringers, girders or trusses during jacking operations shall be shown on the Plan.

D3. A haunch table shall be provided in the Plans. The Designer shall solve for the dead load deflections of all pertinent components.

5. Miscellaneous Notes

M1. Design Specifications (applies only to work of this contract): Current New York State Department of Transportation Standard Specification for Highway Bridges and ~~1969 American Welding Society, modified.~~

M2. Loading (applies only to work of this contract).

M3. Material and Construction Specifications' (applies only to work of this contract): Specifications of New York State Department of Transportation dated January 2, 1973.

6. Hydraulic Data *(If Hydraulic Report is necessary)*

	Basic Flood'	Design Flood
Recurrency Interval	100 year	50 year
Peak Discharge		
High Water Elevation		

7. Preliminary Estimates (see VII of Procedure)

- a. Reconstruction Est. _____ (use current bid prices)
- b. Replacement Est. _____ (get \$/sq-ft figure from Preliminary Plans Unit.)

DESIGNED BY _____ DATE _____

REVIEWED BY _____ DATE _____

FIELD INSPECTION REPORT

DATE _____

PIN _____ BIN _____ COUNTY _____ REGION _____

TOWN, VILLAGE OR CITY _____

PROJECT NAME _____

FEATURE(S) CARRIED _____

FEATURE(S) UNDER _____

REFERENCE MARKER LEGEND _____

INSPECTION DATE _____

INSPECTED BY _____

INSPECTION REPORT BY _____

BACKGROUND:

The structure consists of five spans; one 35'-0" I-Beam span (Span 1), one 195'-0" through truss span (Span 2), two 100'-0" through plate girder spans (Spans 3 and 4), and one 130'-0" through truss span (Span 5). The 130'-0" through truss span was built in 1940 under Contract R.C. 1921 and the south end was jacked up in 1939 under Contract R.C. 4000 when the remaining four spans were constructed. The structure has a 30'-0" roadway curb-to-curb with a 7'-8" wide sidewalk on the west side. Spans 1 and 2 have a 7- $\frac{1}{2}$ " reinforced concrete slab with a 3" concrete wearing course. Spans 3 and 4 have a 7- $\frac{1}{2}$ " reinforced concrete slab with a 3" concrete wearing course. Span 5 has a 7- $\frac{3}{4}$ " reinforced concrete slab with a 4" concrete wearing course. Spans 1 through 4 have a 3/8" thick membrane waterproofing. All spans have been resurfaced with approximately 3" of asphalt pavement. The structure carries touring Route 28 over the Mohawk River and Barge Canal.

(Draw Plan sketch with north arrow.)

OBSERVATIONS:

SUBSTRUCTURE:

With the aid of a boat and crew of the Canal Department, we were able to inspect all piers and steel under the deck.

Piers No. 1 and 2 showed some amounts of spalling around the base and top of columns around the pedestals. Also, the Pier 1 cap beam shows spalling down to the reinforcement in some areas.

Pier 3 is in excellent condition with very little spalling visible.

Pier 4 is a solid pier with 1'-6"+ high concrete pedestals which were added in 1939 when the end truss span was jacked. On both the east and west sides, severe cracking has occurred down between the pedestals, and also on the west side a large crack has developed under the bearing base plate on the girder span. Extensive spalling has occurred on the north and south sides of the pier. The top of the pier is completely disintegrated to a depth of 1'-0" or more in places. The area under and around the east pedestals is undermined severely. This condition exists to a lesser degree on the west pedestals as well.

The south abutment backwall is almost completely deteriorated while the bridge seat and wingwalls show spotty surface spalling in numerous areas.

The north abutment backwall is also almost completely deteriorated. The areas around and under the bearing pedestals are spalled considerably with the base plates undermined in several places. The wingwalls and vertical face of abutment wall show numerous areas of surface spalling.

Two cores have been requested for each substructure element to determine depth of deterioration.

SUPERSTRUCTURE:

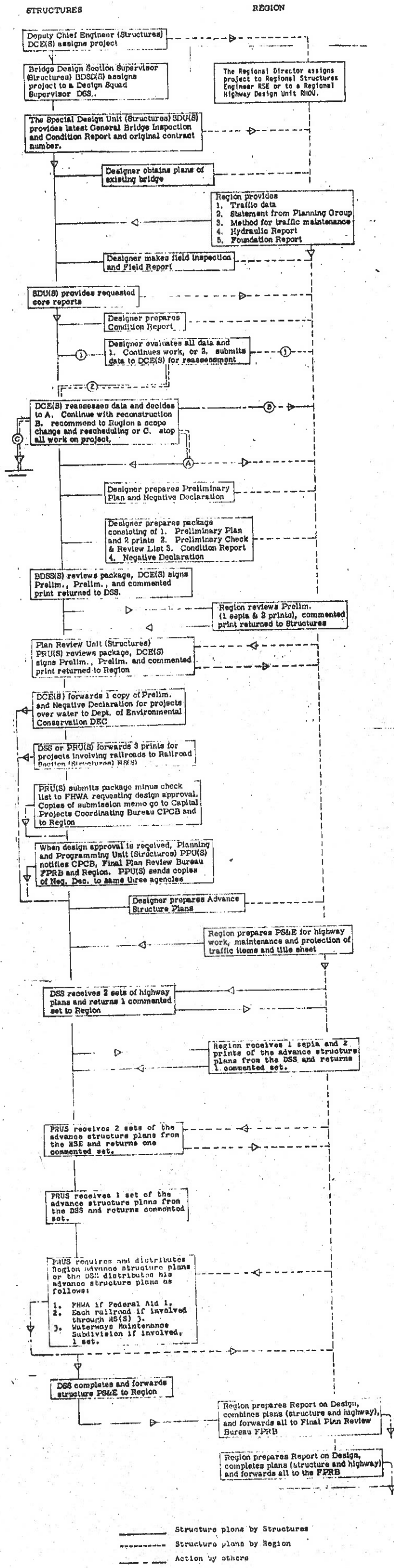
The 3"+ asphalt wearing surface is in fair condition with slight rutting noted in the wheel track along with some pot holes. The 4" concrete wearing course is completely deteriorated. The structural slab on Spans 1-4 has some tight horizontal cracking at the top steel near the joint and curb areas, but otherwise is structurally sound. On Spans 1 and 2, the east fascia is badly disintegrated in most areas. Also Span 1 utilizes two reinforced concrete end diaphragms which show numerous areas of spalling on the interior vertical faces and bottom surface. The depth of spalling appears to be only to the reinforcement of these diaphragms.

The structural slab on Span 5 is completely deteriorated and contains many holes through the slab near the curb. The sidewalk on this span is comprised of timber planking over the old concrete walk.

The steel below the deck shows considerable rust at connection points and around the joint areas, but no heavy lamination was found. The east fascia stringer on Span 2 is rusted badly and there is a possibility that this may have to be replaced after visual inspection when the concrete fascia is removed and repaired. All steel above the deck is in good condition with the exception of the north portal of Span 5 which has been damaged.

The expansion dams show some rusting, but appear to be intact and operating as are the expansion bearings at all locations.

Cores of the deck have been requested to confirm our observations. The Shop Drawing and Fabrication Unit have been requested to make ultrasonic tests of thickness of bottom lateral gussets, floor beam webs, and fascia stringer webs and bottom flanges.



_____ Structure plans by Structures
 - - - - - Structure plans by Region
 - - - - - Action by others