

**THIS SCOPE IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND IS NOT TO BE USED TO DEVELOP COST PROPOSALS OR TO BE INCLUDED IN REPORTS. THE ACTUAL, BRIDGE SPECIFIC, HYDRAULIC INSPECTION SCOPE-OF-WORK WILL BE PROVIDED THROUGH THE NJDOT PROJECT MANAGER.**

SCOPE OF WORK FOR CONSULTANT INSPECTIONS

Type H (Current Date)

(State or County) Bridges

Group XXXX

State Job No. XXXXXXXX

3. For Movable Bridges

a) Hydraulic System Inspection

(3.a.1) Review previous inspection reports. Obtain and/or prepare the necessary drawings and other related data and services required in the mobilization for the inspection specified herein. Include the coordination of the inspection specified herein with the U.S. Coast Guard, Department forces, or County Agencies. Include the notification of local police prior to performing any inspection/testing activity that may disturb vehicular traffic on the bridge. Inspection/testing activities that disturb vehicular traffic shall only be performed during off peak hours.

**For security reasons, a 72-hour notification must be given prior to the start of the on-site inspection. Access to the bridge will not be allowed without this advance notification. The following agencies must be notified:**

<b>Structural Evaluation</b>	<b>609-530-3572</b>
<b>Movable Bridge Engineering</b>	<b>609-530-2163</b>
<b>Bridge Operations</b>	<b>732-528-9494</b>
<b>Traffic Operations North</b>	<b>201-797-3676</b>
<b>Traffic Operations South</b>	<b>856-486-6650</b>

(3.a.2) Prior to inspection, perform a walk through of the system and note any signs of hydraulic fluid leakage. Clean the outside of the system of dirt, debris, or standing fluid including valves, manifolds, and fittings using a clean wipe. Do not use detergents or solvents other than hydraulic fluid. Witness the system in operation, observing the power unit, near drive cylinder, far drive cylinder, and piping. Perform a visual inspection of the operating machinery and associated components. Utilizing the checklist, EL-45Hc, identify and record any and all deficiencies, particularly those areas needing immediate corrective action in order to keep the bridge safely in service. Clean, remove and replace equipment inspection covers or enclosure panels, as required, to perform the inspections specified herein. Unless stated elsewhere herein, Department personnel will not be utilized for this purpose. Record date, time and any condition that may affect inspection results at the time of testing. Record all nameplate information for all mechanical equipment in the field notes. Detail the procedures and equipment used for each task in the field notes. Utilize the equipment manufacturer's field engineer, if deemed necessary, to perform specified inspections. Identify each type of equipment for which an equipment manufacturer's field engineer's assistance will be required.

The hydraulic equipment inspection will include, but not necessarily be limited to, a detailed examination for smooth operation, uniform and regular movement, synchronization, interlock, mounting, overheating, vibration, wear, rust, noise, slippage, engagement, applied tension, lubrication, fluid levels, fluid contamination, dirt accumulation, fluid pressure, leakage, alignment, clearances, accumulator pressure, weather tightness, safety and signs of distress or pending distress with regards to the following components:

reservoir:	including cleanout cover seals, drip tray, heat exchanger, sight & temp. gauges, hygroscopic breather, return filter, temperature switches, & bulkhead fittings
hydraulic fluid:	sample and perform fluid sample analysis
main manifold:	including proportional relief valve, pressure filters, pressure switches, pressure gauges, & flow meter
hydraulic plumbing:	including pipe, tube, supports, fittings, heat tracing
hydraulic cylinder supports:	include inspection of cylinder support clevises, cylinder support bracket and hydraulic pins
anchor bolts:	cylinder support clevis through anchors
hydraulic cylinders:	including cylinder cap bolts, heat tracing, test ports, manifolds, valves, proportional directional valves, shutoff valves, piping, hoses, rods, rod seals, & linear displacement transducers (LDT=s)
cylinder bearings:	inspect cylinder rod end and blind end spherical plain bearings
accumulator assembly:	accumulator, precharge pressures, pressure gauge, manual bleed down valve, solenoid bleed down valve, & shutoff valve
pump/motor assembly:	pump suction line, shutoff valve and limit switch, motor, & pressure hoses
couplings:	pump motor couplings
auxiliary drive system(s):	verify function of crossover valving and maintenance mode system relief and cylinder proportional valve controls
hydraulic control panel:	proportional relief valve controller, proportional directional valve controllers, internal components, indicator lights, & wiring

(3.a.3) Measure system flow and pressure and accumulator pressure for raise and lower cycle and record in the inspection reports. Record date, time, weather, wind velocity and direction at the time of testing. Detail the procedures and equipment used in field notes. Compare to original values and the values stated in previous reports.

(3.a.4) Take fluid samples and perform analysis per ISO Solid Contaminant Code. Compare to original values and the values stated in previous reports. Provide copies of measurements in the inspection reports. Detail the procedures and equipment used in field notes.

(3.a.5) Following the procedure documented on the power unit, test the PLC bypass operating mode. This involves setting of flow control valves on the power unit, manual selection of a single pump, operation of the pressure relief valve using the remote power/control source, and operation of one proportional directional valve using the remote power/control source. Verify span operation in both raise and lower directions. Measure system flow, pressure, and oil temperature and record in the inspection reports. Record date, time, weather, wind velocity and direction at the time of testing. Detail the procedures and equipment used in field notes.

(3.a.6) Inspect front face of hydraulic power unit control panel. Verify proper operation of all push buttons, selector switches, and indicator lights. Verify control device labels are present and properly secured. Inspect the enclosure interior. Interior should be free of debris, spare parts, paper work, and tools. Verify proper routing and termination of all conductors. Verify secure installation of all Aplug and socket type components. Measure power supply voltages and compare to previous reports. Inspect panel components during several bridge cycles. Verify proper operation of valve amplifier cards, PLC I/O cards, and mechanical relays. Record any excessive temperature rise in any component.

(3.a.7) Prepare and submit a concise report of the hydraulic system inspection specified herein. The report shall include:

1. A description of the structure, its hydraulic operating system, and all major equipment
2. A copy of this scope of work.
3. Completed inspection form EL-45Hc
4. A typed copy of all field notes
5. A summary of conclusions and recommendations
6. Cost estimates for recommended repairs
7. Final Hydraulic Inspection Report in electronic form

**Note: Any condition requiring immediate corrective action or priority repair shall be promptly reported, in writing, to the Department.**

New Jersey Department of Transportation  
**DRAWBRIDGE HYDRAULIC SYSTEM INSPECTION REPORT**

DATE: ___/___/___	WEATHER: _____	TYPE _____	INSPECTION <small>(I or II)</small>
INSPECTOR: _____		TEMPERATURE: _____ ° F	
ROUTE: _____	BRIDGE: _____	STRUCTURE NO.: _____	

**HYDRAULIC SYSTEM**

The following were evaluated for smooth operation, uniform and regular movement, synchronization, interlock, mounting, overheating, vibration, wear, rust, noise, slippage, engagement, applied tension, lubrication, fluid levels, fluid contamination, dirt accumulation, fluid pressure, leakage, alignment, clearances, accumulator pressure, weather tightness, safety and signs of distress or pending distress with regards to the following components:

**3=Operational/Needs Minor Work   2=Operational/Needs Major Work**  
**1=Non Operational   S=Satisfactory   N=Not Applicable**

RESERVOIR		HYDRAULIC CYLINDER SUPPORTS	
HEAT EXCHANGER		HYDRAULIC CYLINDERS	
SIGHT & TEMPERATURE GAUGE		CYLINDER MANIFOLDS & VALVING	
HYGROSCOPIC BREATHER		CYLINDER PIPING & HOSES	
RETURN FILTER		CYLINDER FASTENERS / ANCHORS	
TEMPERATURE SWITCHES		CYLINDER RODS	
HYDRAULIC FLUID		CYLINDER ROD SEALS	
MAIN MANIFOLD		CYLINDER BEARINGS	
PROPORTIONAL RELIEF VALVE		LDT=S	
PRESSURE FILTERS		ACCUMULATOR ASSEMBLY	
PRESSURE SWITCHES		PUMP MOTORS	
PRESSURE GAUGES		PUMPS	
FLOW METER		PUMP SUCTION LINE / VALVE	
HYDRAULIC PLUMBING		PUMP PRESSURE HOSES	
ANCHOR BOLTS		PUMP/MOTOR COUPLINGS	
HPU CONTROL PANEL		AUXILIARY DRIVE SYSTEM	

**ATTACH EXPLANATION OF WORK NEEDED**

## CONSULTANT'S MAN-HOUR PROPOSAL PER-TASK WORKSHEET

Fill in estimated time per task, and provide for review to the  
 Movable Bridge Engineering Group  
 Phone 609-530-2163 – Fax 609-530-4444

BRIDGE \_\_\_\_\_ GROUP \_\_\_\_\_ JOB # \_\_\_\_\_

### HYDRAULIC INSPECTION

TASK ID	TASK DESCRIPTION	CONSUL. ESTIMATED HOURS
3.a.1	<b>Mobilization</b> - Review previous data, prepare forms	
3.a.2	<b>Perform Visual Hydraulic Inspection</b> - Complete Form EL-45Hc.	
3.a.3	<b>System Flow</b> – Measure system flow and pressure and accumulator pressure for raise and lower cycle and record in the inspection reports.	
3.a.4	<b>Fluid Samples Analysis</b> – Take fluid samples and perform analysis per ISO Solid Contaminant Code.	
3.a.5	<b>PLC Bypass Mode</b> – Test the PLC bypass operating mode.	
3.a.6	<b>Hydraulic Power Unit</b> - Inspect front face of hydraulic power unit control panel.	
3.a.7	<b>Prepare Report</b> – Include all information as described above.	

TOTAL HYDRAULIC HOURS

Estimated by \_\_\_\_\_ Date \_\_\_\_\_