



AGENDA ITEM EXECUTIVE SUMMARY

Title: Recommendation to Approve Bridge Closure Policy

Presenter: Karen Young

Please check appropriate box:

<input type="checkbox"/>	Government Operations	<input checked="" type="checkbox"/>	Government Services 02.23.2015
<input type="checkbox"/>	Planning & Development	<input type="checkbox"/>	City Council
<input type="checkbox"/>	Public Hearing	<input type="checkbox"/>	

Estimated Cost:	N/A	Budgeted:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
-----------------	-----	-----------	---	-----------------------------

If NO, please explain how item will be funded:

Executive Summary:

As a result of extreme flooding events that have taken place over the years the City has drafted a Bridge Closure Policy to establish a procedure and set of guideline regarding the monitoring, closure and re-opening of the local roadway bridges (crossing the Fox River). It is noted that the policy is a set of guidelines for Staff to use when making judgments on actions to take or not take and decisions regarding the status of the bridge. Please see attached Bridge Closure policy for details.

Attachments: *(please list)*

City of St. Charles Bridge Closure Policy

Recommendation / Suggested Action *(briefly explain):*

Recommendation to Approve Bridge Closure Policy.

For office use only: Agenda Item Number: 5.f

City of St. Charles Bridge Closure Policy

Purpose : The City has drafted this policy to establish a procedure and set of guidelines regarding the monitoring, closure and re-opening of the local roadway bridges (crossing the Fox River) as a result of an extreme rainfall event. It is noted that the policy is a set of guidelines for individuals to use when making judgments on actions to take or not take and decisions regarding the status of the bridge.

References : A variety of resources were reviewed in an effort to find a similar written policy regarding bridge closure and monitoring during flood events. A directly comparable policy was not found. However, a similar policy with a focus on scour critical bridges was found in Federal Highway Authority literature and several state DOT's (FHWA Memo dated July 24, 2003 : Compliance with the National Bridge Inspection Standards; Plan of Action for Scour Critical Bridges). The Scour Critical Bridge criteria were used as a guideline in developing the City of St. Charles Bridge Closure Policy hereafter.

Criteria for Determination of Bridge Closure

The following criteria are identified as the primary elements to be evaluated when making a decision to close local roadway bridges crossing the Fox River or to re-open a bridge after it has been closed. The decision to keep the bridge open or closed will be based on a combination of criteria and conditions. In an effort to provide definitive guidelines, we have identified value ranges and a decision flowchart to assist with the decision making process.

- River Stage
- Site Inspection (visually changed condition)
- River Stage Prediction (rising / falling)
- Precipitation (24 – 48 hour forecast)
- Impact on emergency services

River Stage

Perhaps the most critical criteria is the elevation of the river at the upstream face of the bridge. The bearing seat elevation is considered to be the critical elevation relative to river stage. Any water elevation within one foot of the bearing seat should put the City on alert status. If the water is at or above the bearing seat we recommend closure of the local roadway / bridge. Please note the bearing seat is below the low chord elevation however we are concerned with scour / water velocity and debris impact to possibly compromise the condition of the bearings or supporting concrete pier.

Site Inspection

Monitoring bridge condition during a flood event is critical to note any cracking or settlement of walks, railings or pavement on or adjacent to the bridge. The following items should be observed and noted.

- Settling of approach pavement.
- Cracks or movement in joints on the bridge deck, sidewalk and railings.
- Debris jams or ice (extent of debris suspended during event).

- Concrete spalls or obvious cracking.
- Superstructure vibration or movement.
- Upstream and downstream bridge conditions as applicable.

It is imperative that the inspector be familiar with pre-flood conditions and it is preferred that only one inspector be assigned to monitor conditions from the beginning of a flood event to the end. Any observed cracking, spalling or settling should cause immediate closure of the bridge until further inspection can verify the integrity of the structure. Also, excessive debris or ice in the river or structure vibration warrants closure of the bridge.

River Stage Prediction

Whether the river is rising or falling it is important to consider in addition to the water elevation relative to the bearing seats. River stage can be determined from the following web site:

<http://water.weather.gov>.

The Advance Hydrologic Prediction Service indicates current and historic river stage and predicts stage crest during a flood event. This site provides information at Algonquin (upstream) and Montgomery (downstream).

In addition to river levels, operation of the Stratton and Algonquin dams can have an impact on river elevations in St. Charles. These dams are controlled and operated by IDNR. Information regarding the operation including history, operation guide and current status can be found at

<http://www.dnr.illinois.gov/waterresources/pages/strattonlockanddam.aspx>

In addition the USGS [WaterAlert](#) program allows users to subscribe and receive daily or hourly updates about current conditions in rivers utilizing the same Fox River gages noted above. For mobile access, [USGS WaterNow](#) allows users to send an email or text message to WaterNow@usgs.gov containing a USGS current-conditions gaging site number to quickly receive a reply with its most recently logged observation(s).

Precipitation Prediction

In conjunction with the predicted river stage the precipitation forecast is important. It is assumed the City has monitoring resources to obtain precipitation forecast. In general the 24 to 48 hour forecast is the most important to evaluate relative to the river stage prediction noted above. If the river stage is not expected to rise but there is significant rainfall in the forecast consideration for bridge closure should be made. The threshold for 12, 24 and 48 hour rainfall depth is set at the one year recurrence frequency or 2.18, 2.50 and 2.70 inches respectively.

Impact on Emergency Services

Prior to any final decision to close any local roadway / bridge the operating condition of adjacent bridges and roads relative to emergency services need to be considered. Closure of any bridge could have an impact on response time particularly if an adjacent bridge or road is closed due to construction or

weather conditions. It is suggested agreement from police and fire departments be sought prior to any physical closure of any bridge. These departments would not judge if the closure is appropriate based on the standards set herein but is intended to give these departments the ability to “veto” a closure if they have an overriding public safety concern.

Indiana Street Pedestrian Bridge

It is noted that the pedestrian bridge over the Fox River at Indiana Street is a unique situation. The Illinois Street Bridge has bearing seats lower than the Indiana Street pedestrian bridge. Therefore the closure of Illinois Street Bridge shall cause the closure of the Indiana Street pedestrian bridge. Likewise the opening of the Illinois Street Bridge shall cause the opening of the Indiana Street pedestrian bridge.

Bridge Closure / Opening Operational Procedure:

- Prior to a flood event
- During a flood event
- During Bridge Closure
- After the flood event

Prior to monitoring the following is recommended:

- Determine what utilities are attached to the bridge and shutoff procedures to isolate these utilities.
- Create a contact list for private utility companies.
- Assign monitoring responsibilities within PW (primary, secondary, etc.).
- Create a public relations contact list in the event of a closure.

Before a flood event

- Department of Public Works (assign individual) to monitor high water elevations and in particular seek field observation of Fox River elevation relative to low chord and/or bearings for the Illinois Street Bridge.
- No formal documentation required, however, hand written notes are suggested/recommended including dates, times and general observations.
- It is suggested/recommended to look upstream and downstream at adjacent stream conditions and bridges to see if anything unusual is observed.
- The Director of PW is notified when water is within one foot of the beam bearings. The DPW determines if the condition is considered a “flood event”. If so, additional documentation and monitoring is required. See below.

During a flood event

- After the Director of PW reviews the observation and determines the condition a “flood event” the following additional monitoring and documentation is recommended.

- Determine the rainfall forecast and river stage forecast via NOAA Advanced Hydrologic Prediction Service.

<http://water.weather.gov/>

- PW staff performs and documents observations noting time date, elevation reference to bearings and digital photos. Determine trend of river stage (rising / falling). Perform observations twice daily unless rapid changes in elevation are noted then more frequently.
- Notify Emergency personnel (Fire & Police) that the bridge is being monitored with a potential to be closed.
- Verify road closure / detour route signage is available and ready.
- Inspect for and document (See attached form):
 - Settling of approach pavement.
 - Cracks or movement in joints on the bridge deck, sidewalk and railings.
 - Debris jams or ice (extent of debris suspended during event).
 - Concrete spalls or obvious cracking.
 - Superstructure vibration or movement.
 - Upstream and downstream bridge condition.
- If water (turbulent or steady flow) is at the beam bearings and the river is documented to be rising and expected to continue rising or there is a forecast for rain, bridge closure is recommended. The Director of PW should be notified to make a decision on bridge closure.
- Fire and Police should be consulted as well to determine emergency call response concerns with closing the bridge. Inspections should occur every 6 hours at a minimum. The frequency of inspections is a judgment call based on precipitation / river stage forecast and prior observations. Determine construction or other road closures that make the Illinois Street Bridge critical for emergency response.
- If water is above the bearings and near the low chord elevation the bridge should be closed. Fire and Police should be consulted as well to determine emergency call response concerns with closing the bridge. Inspections should occur every 6 hours at a minimum.

During Bridge Closure

- Establish road blocks and detour route. Implement signal modifications (flashing red).
- Execute Public Relations contact procedure notifying:
 - All City Departments and Elected Officials
 - City St. Charles community members
 - Adjacent communities
 - School Districts
 - County and State EMA
 - Media outlets
- Notify utility companies of bridge closure.
- Monitor bridge every 4 hours, noting high water elevation and inspecting for:
 - Settling of approach pavement

- Cracks or movement in joints on the bridge deck, sidewalk and railings.
- Debris jams or ice (extent of debris suspended during event)
- Concrete spalls or obvious cracking.
- Superstructure vibration or movement.
- Upstream and downstream bridge condition.
- Document inspections with written forms and digital photos.
- Identify sources of emergency repair materials (asphalt, concrete, stone).
- When water has receded to the beam bearing elevation and the river stage is falling and expected to continue falling and there is no significant precipitation in the forecast, the bridge shall be inspected one last time and may be opened to traffic / pedestrians as determined by the Director of PW.

After the flood event

- Open road and return signals to normal operation.
- Notify Public utilizing Public Relations contact procedure of opening.
- Review documentation. Gather missing photos, reports, notes.
- Inspecting bridge for:
 - Scour at piers or abutments.
 - Settling of approach pavement.
 - Cracks or movement in joints on the bridge deck, sidewalk and railings.
 - Debris jams or ice (extent of debris suspended during event).
 - Concrete spalls or obvious cracking.
 - Superstructure vibration or movement.
 - Upstream and downstream bridge condition.
- Review this policy for updates and additional detail.

Bridge Inspection Form

Location & Structure #: -

Date: _____ Time: _____ Weather: _____

Inspector: _____

Above

River Stage (based on gage or bearing seat) _____ Ft.

At

Below

Rainfall forecast 24 Hours _____ in. 48 Hours _____ in.

River stage forecast Algonquin _____ Montgomery _____

Visual Observation

A. Settling of approach pavement

Yes No

Comments: _____

B. Cracks or movement in joints on the bridge deck, sidewalk and railings

Yes No

Comments: _____

C. Debris jams or ice (note extent of debris suspended observed)

Yes No

Comments: _____

D. Concrete spalls or concrete cracking

Yes No

Comments: _____

E. Superstructure vibration or movement

Yes No

Comments: _____

F. Unusual upstream or downstream river / bridge condition

Yes No

Comments: _____

- If any box A-F is checked "yes" bridge closure is recommended.

The Director of PW notified PW Director Approved Closure - Yes or No

Fire and Police notified If yes, Public Relations Procedure Enacted

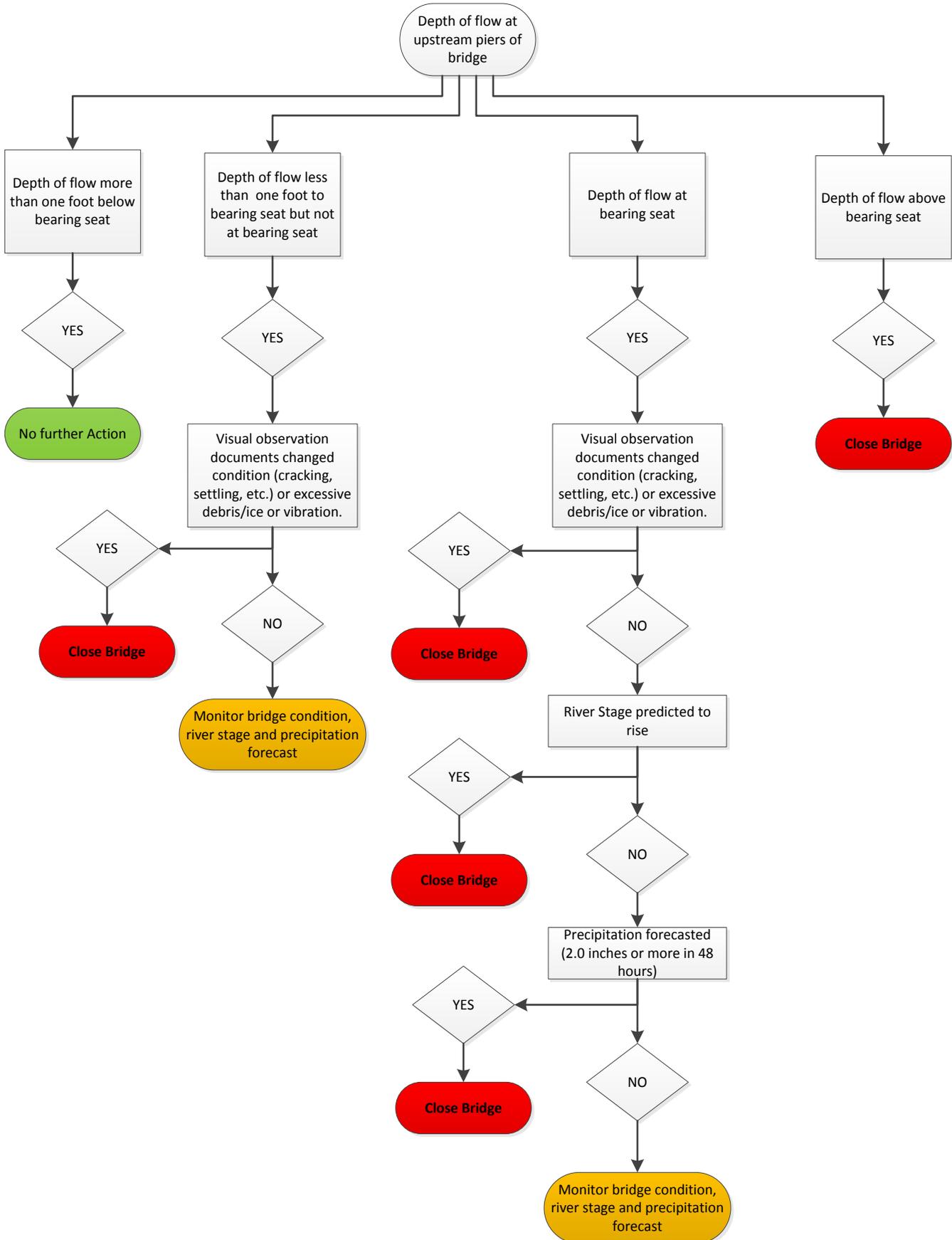
Signage on standby

Photos attached or file location: _____

Miscellaneous Comments:

Form Checked By : _____

CITY OF ST. CHARLES BRIDGE CLOSURE DECISION FLOW CHART



CITY OF ST. CHARLES BRIDGE OPENING DECISION FLOW CHART

