Hazard Profile – Dam Failure

Description

Dams are manmade structures built for a variety of uses, including flood protection, power, agriculture, water supply, and recreation. Dams typically are constructed of earth, rock or concrete. Two factors that influence the potential severity of a full or partial dam failure are the amount of water impounded and the density, type, and value of development and infrastructure located downstream. Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding, which result in overtopping
- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage or piping.
- Improper design
- Improper maintenance
- Failure of upstream dams on the same waterway
- Negligent operation
- Overtopping is the primary cause of earthen dam failure.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Associated water quality and health concerns could also be an issue. Dam construction, operation, maintenance and inspection is regulated by the New York State Department of Environmental Conservation.

Location and Extent

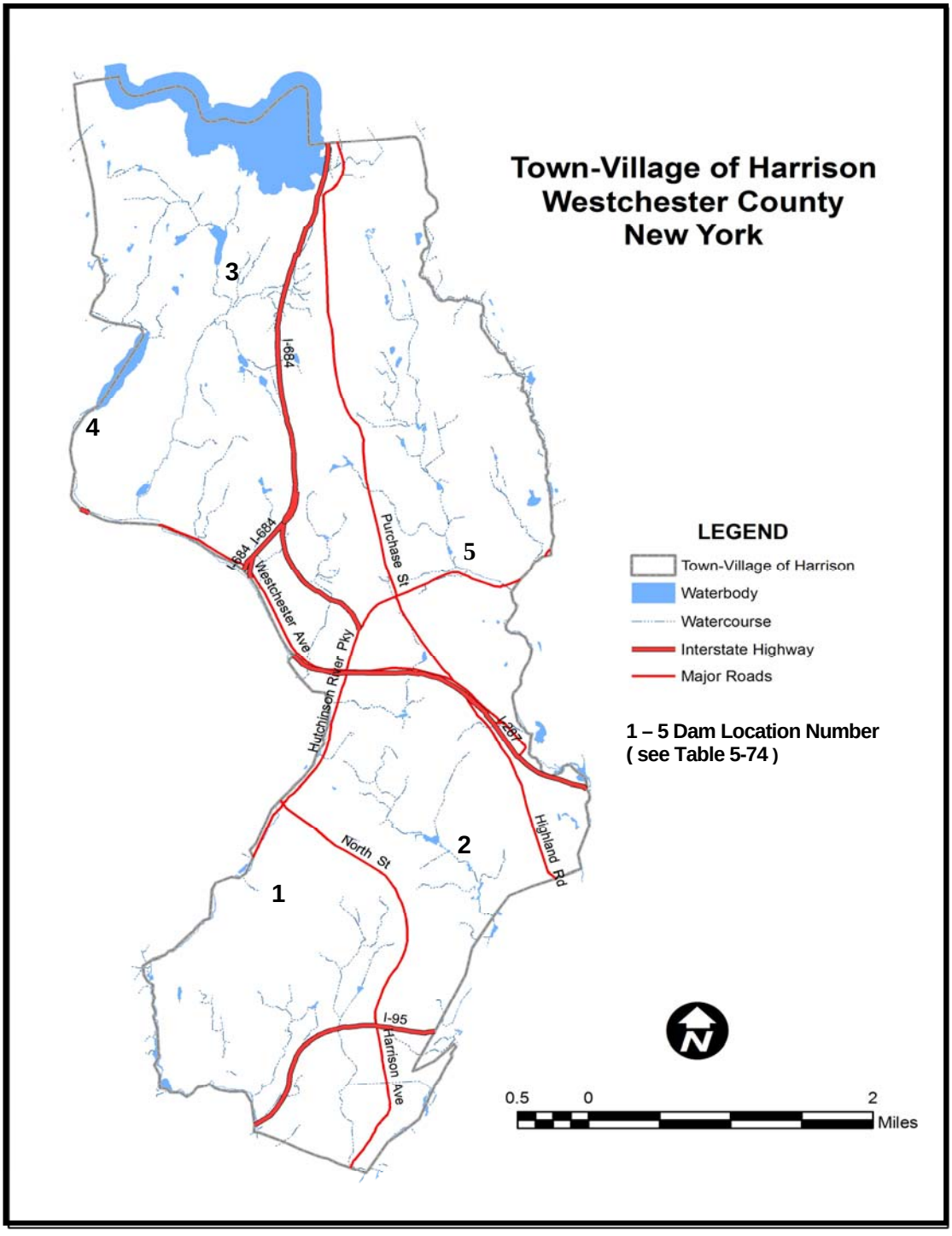
There are five dams located in the study area the details for each of which are indicated in Table 5-83.

Table 5-83 Dams in the Study Area

Location Number	NYSDEC ID Number	Name	Hazard Code	Built	Last Inspected	Type	Purpose	Owner
1	233-4861	Hutchinson River Parkway Detention	A			Earth	Flood Control	State
2	233-4831	Brookside Lower Dam	A	1985		Earth	Flood Control	Private
3	195-1467	Forest Lake Dam	C	1996	2006	Earth	Flood Control	Private
4	146-0506	Silver Lake Dam	B	1815	2007	Earth	Recreation	Local Government
5	232-3111	Fogar Bronfman Lalor Dam	A	1962	1972	Gravity	Fire/Stock	Private

Source: NYSDEC Dam Inventory

Figure 5-34 Study Area Map with Dam Locations



Sourcee: GIS Base Map and NYSDEC Dam Inventory

The following describes the Hazard Codes of each dam as defined by the New York State Department of Environmental Conservation

(1) Class A dams are located in areas where failure will damage nothing more than isolated buildings, undeveloped lands, or town or county roads and/or will cause no substantial economic loss or substantial environmental damage. Class A dams are considered to be Low Hazard dams.
(2) Class B dams are located in areas where failure may damage isolated homes, main highways, minor railroads, interrupt the use of relatively important public utilities and/or will cause substantial economic loss or substantial environmental damage. Class B dams are considered to be Intermediate Hazard dams.
(3) Class C dams are located in areas where failure may cause loss of human life, substantial damage to homes, industrial or commercial buildings, important public utilities, main highways or railroads and/or will cause extensive economic loss. Class C dams are considered to be High Hazard dams.

Previous Occurrences and Losses

There are no records of any of the dams located in the study area as having failed.

Probability of Future Events

The likelihood of a dam failure in the future is minimal. There would most likely be some warning before such an event with the event being secondary to heavy rain and associated flooding.

Vulnerability Assessment

Overview of vulnerability

While a dam failure is a rare event, impacts to property owners immediately adjoining these type facilities could be substantial.

Data and Methodology

The majority of the data used was obtained from the New York State Department of Environmental Conservation Dam Inventory records. Additionally, a review was made of records available from the National Dam Performance Program and National Inventory of Dams. Minimal information was available locally.

Impact on life, safety and health

Of the 5 dams in the study area, only one (Forest Lake Dam) carries the highest hazard classification of "C" (see definitions above). A breach of any of these dams in the study area has the potential to cause property damage and generate a response by the Town/Villages Emergency Services organizations. The Forest Lake Dam has the potential to cause a life threatening situation should it fail. The owner(s) of the dam are in the process of having an Emergency Action Plan prepared (draft completed as of March 24, 2009).

Identifying structures including general building stock, critical facilities and critical infrastructure

HAZUS –MH does not provide an analysis for general building stock, critical facilities or critical infrastructure for the dam failure hazard event. As part of its mitigation strategy, the Town / Village will implementation as program to identify the downstream impact of a dam failure on these community features.

Economic impact

The economic impact of a failure of any of the 5 dams in the study area is not part of the HAZUS-MH program. An analysis of the downstream impacts to general building stock, critical facilities and critical infrastructure will assist in developing this type of information.

Addressing Repetitive Loss Properties

The National Flood Insurance Program provides information on payments to homeowners resulting from losses due to flooding. Under the dam failure category, flooding may be a secondary or resulting event brought about by large volumes of water suddenly being released. Flooding events, repetitive loss properties and the associated analysis are discussed elsewhere in this report.

Estimating Potential Losses

HAZUS-MH does not estimated potential losses for dam failure events. This type of information will need to be developed and analyzed locally as part of the Town / Village of Harrison long term mitigation strategies.

Analyzing Development Trends (new buildings, critical facilities and Infrastructure)

Section 4 of this plan Municipal Profile – Future Development identifies several areas in the Town / Village of Harrison where the potential for development or redevelopment exists. As of January 1, 2009, construction underway is limited due to the economic turndown. Any structures, critical facilities and infrastructure contemplated in proximity of a dam, or downstream from a dam, need to be aware of the potential for flooding should a failure or overtopping occur.

Additional Data and Next Steps

Three of the five dams located in the study area are privately owned. Where required by law, owners of all the dams needing an emergency action plan prepared will be notified in order to determine the potential impact to downstream life and property. The New York State Department of Environmental is in the process of updated regulations concerning the ownership,

operation and maintenance of dam facilities. The Town / Village will review these updates and inform facility owners where necessary.

Overall vulnerability conclusion

Dam failure has been determined to be a rare and thus a low risk event.