MEMORANDUM

To: Board of Hudson River - Black River Regulating District
From: Glenn A. LaFave, Executive Director
Robert P. Leslie, General Counsel
Richard J. Ferrara, Chief Fiscal Officer
Robert S. Foltan, P.E., Chief Engineer
Michael A. Clark, P.E., Hudson River Area Administrator

CC: file

Date: 12/1/2009 (for December 8, 2009 Board Meeting)

Re: Apportionment Methodologies

The Board has directed Regulating District staff to identify and summarize an approach to completion of an internal apportionment performed by Regulating District staff for the purpose of expediting the generation of revenue and facilitating the potential sale of tax anticipation notes. Additionally, the Board has asked for a complete timeline and schedule that reflects both an internal, staff facilitated, apportionment and a consultant generated reapportionment study, the review and approval process (Department of Environmental Conservation), and the Board's review, adoption, and implementation of the apportionment plan.

Regulating District staff has examined four approaches, based on various methods, to determine an apportionment. In the process, two methods for calculating the apportionment were eliminated from consideration after thorough examination of the studies and data on which these apportionments would have been based revealed inaccuracies and inconsistencies. Two of the four approaches to determining an apportionment were explored in detail. A discussion of the two possible methods for determining apportionment as well as the rejected methodologies and questionable data is provided below.

The following discussion of two possible apportionment methodologies draws a distinction between the process of identifying beneficiaries and the process of calculating an apportionment. Identification of a group or category of beneficiaries is a process which is independent of the apportionment calculation method and is a step that must take place regardless of the process used to calculate the apportionment.

For the purpose of an internal apportionment, staff has identified two categories of beneficiaries:

- counties
- cities, towns, and villages.

A detailed discussion of the statutory and legal basis for selection of counties, and cities, towns, and villages, as beneficiaries, is included in a separate memorandum from General Counsel to the Board.

The process of calculating an apportionment (referred to herein as the apportionment *Method*) is the system used to determine a relative percentage by which the assessment may be levied among a group or category of beneficiaries. However, the quality and detail of the data used to calculate the apportionment can preclude its application to a specific group or category of beneficiary.

Regulating District staff concluded, for the purpose of an internal apportionment, that flood protection is the most direct and clearly defined benefit to the beneficiaries derived from the operation of river regulating reservoirs. Staff also recognizes that flood protection is received, not only by properties in the flood plain, but by the greater community which avoids loss of public infrastructure (i.e., roads, bridges, water, sewer, etc.). To that end, staff focused its attention on development of methods of apportioning cost among counties, and cities, towns, and villages, or a combination of these, who receive flood protection benefit. Staff has identified two methods for determining an apportionment of benefit, derived from flood protection provided by the Great Sacandaga Lake, which are believed to be reasonable and appropriate, and which could be completed by Regulating District personnel.

Apportionment Methodologies

Detailed below are two methods for determining the relative percentage of benefit (apportionment) derived from flood protection.

- Method A proposes the use of existing *New York State Standard Multi-Hazard Mitigation Plan* (NYSHMP) data in a generalized estimate based on the average value for structures in the 100-year flood plain and the actual quantity of structures receiving flood protection from the operation of the Great Sacandaga Lake. Method A will result in a county-level,

or a city, town and village-level apportionment and would be suitable for development of an assessment of the five counties (Albany, Rensselaer, Saratoga, Washington, Warren), or the thirty-five cities, towns and villages that receive flood protection.

- Method B proposes the use of the Federal Emergency Management Agency's (FEMA's) Hazards U.S. Multi-Hazard (HAZUS-MH) assessment model to estimate potential property losses from flooding. A copy of this software, available free of charge from FEMA, has been ordered. Method B will result in the calculation of property loss data and would be suitable for a county-level, or a city, town and village-level, apportionment and would be suitable for development of an assessment of the five counties, or the cities, towns, and villages that receive flood protection.

Method A – Property Value Based Apportionment

- Apportionment is based on the value of properties affected by 100-year flood.
- Applicable to a county-level, or city, town and village-level apportionment.

The steps to complete this analysis include:

- Use of *NYS Standard Multi-Hazard Mitigation Plan* data to determine a county-wide and city, town and village-wide average value of properties in a "100-year flood plain."

- Determine the total quantity of properties provided flood protection in each county, city, town and village.

- Multiply the respective county-wide or city, town and village-wide average value of property in a 100-year flood plain by the quantity of properties provided flood protection to calculate the total value of protected properties by county or city, town and village.

- Calculate a county-level or city, town, and village-level beneficiary apportionment by determining the ratio of a county or city, town and village "total value of protected properties" to the value of all county or city, town and village protected properties (the sum of either all protected properties in all five counties or all thirty-five cities, towns, and villages).

3

- Apportion the five counties or the thirty-five city, towns, and villages.

The Method A analysis would be considered an appraisal-level study and would be based on the assumption that the benefit derived by a county or the cities, towns, and villages, from the operation of the Great Sacandaga Lake, is proportionate to the value of the properties within the 100-year flood plain in the counties or the cities, towns, and villages, respectively.

Some data has been collected for this analysis. The completion of a Method A based analysis will require approximately two weeks to complete. The result of this analysis would be available for the January 2010 Board meeting.

Method B – Flood Protection Benefit Based Apportionment

- Apportionment based on the value of flood protection benefit (avoided property loss/damage).
- Applicable to a county-level, or a city, town, and village-level, apportionment.

- Use the Federal Emergency Management Agency (FEMA) HAZUS-MH Flood Model. The HAZUS-MH Flood Model is a nationally applicable standardized methodology that uses state-of-the-art geographic information system (GIS) software to map and display hazard data, the results of damage, impact of flooding, and economic loss estimates for buildings and infrastructure. HAZUS-MH offers three levels of analysis which vary with the level of project specific data used. The greater the level of project specific data used in the model, the greater the quality and detail produced in the model results. A Level 1 analysis would be based on data provided with the software (i.e., census information, broad regional patterns of structure types, foundations, damage from inundation, etc.). A Level 1 analysis is considered an appraisal-level estimate, whose modeling results would be appropriate for a county-level or a city, town, and village-level apportionment.

A HAZUS-MH Flood Model Level 1 analysis would provide an order-of-magnitude determination of flood protection benefit and would be based on a direct calculation of the flood protection benefit derived by each county or by each city, town, and village, whose properties receive flood protection from the

4

operation of the Great Sacandaga Lake.

Regulating District staff estimates that a Level 1 analysis could begin upon receipt of the software, and will require four to six weeks to complete. Staff is prepared to complete this analysis by the first week in January 2010 and have the results available for Board to review at the January 12 meeting.

The nature of the data used in a Level 1 analysis precludes the use of the analysis results in an individual real property-level apportionment. Further refinement of the flood model (Level 2 or Level 3 analysis) could be completed if the improved quality and results justify the additional expense and time associated with the collection and incorporation of project specific details. Regulating District staff believes a HAZUS-MH Flood Model Level 2 or 3 analysis could serve as the basis for a flood protection based apportionment and assessment at the individual real property-level. There is no guarantee, however, that a more property-specific analysis based on increased level of detail, while affecting the total property loss estimate calculated for all properties, will affect the relative proportion of benefit derived by cities, towns and villages.

It is estimated that a Level 2 or Level 3 analysis would require a minimum of six months to complete.

Recommendation:

- Use FEMA HAZUS-MH Flood Model to calculate a Level 1 analysis of flood protection benefit derived by each flood protected county, city, town, and village.

- Establish beneficiary apportionment based on the ratio of individual county "100-year flood protection benefit" to the value of all counties "100-year flood protection benefit," respectively.

- Apportion among the five counties; provide the counties with a summary of the benefit derived by each city, town, and village.

Methodologies Discounted and Data Inaccuracies

Initially, staff examined a method for determining an apportionment based on the Department of Environmental Conservation August 2002 *Flood Impact Economic Study* and the Gomez and Sullivan *Hudson River Flow Regulation Benefit Study*. This method calculated the actual flood protection benefits derived by cities, towns, and villages.   However, inaccuracies and inconsistencies in the data used to calculate the value of flood protection benefit derived by cities, towns and villages compelled staff to eliminate this approach from consideration.

Another approach involved use of the *New York State Standard Multi-Hazard Mitigation Plan* data concerning residential property values in the 100-year flood plain. However, it was determined that the value of other types of properties (commercial, industrial, vacant, etc.) that would not be represented by a purely "residential property value based" analysis, could substantially affect the determination of the benefit derived by cities, towns, and villages within the 100-year flood plain of the Sacandaga and Hudson River.