

## **APPENDIX A**

### **County and NJDA Gauge and Monitoring Station Descriptions**

The gauge and sampling stations for the County and NJDA sampling are described in the following paragraphs moving downstream.

## **WRECK POND BROOK STATIONS**

**W6 – “Martin’s Road”, Wall Township:** This station is the farthest upstream, located above the outlets at Old Mill Road. W9 monitors a large upstream wooded area as well as the runoff generated by several industrial sites located along Rt. 34, and the highway itself. Just downstream of Rt. 34 is a defunct wash pond once used by a sand mining operation. The outlet to the pond has been breached, and the pond itself (this report will refer to the pond as “Kellers Pond”, after K. Thomas Kellers, the originator of this study and a long time resident of Wall Township who frequented this heretofore unnamed pond as a youngster) is shallow and does not maintain a constant pool. However it appears that the pond itself with a breached outlet provides very little in runoff attenuation for peak control.

The actual datalogger location is approximately 60 feet upstream from the culvert on Martin’s Road. Investigators originally proposed to set the logger on the culvert, or just downstream. However, the culvert has a non-level entrance and therefore, standardized hydraulics for measuring flows might not apply to the structure. The channel around the logger itself is sinuous up and downstream of the logger and the floodplain is heavily vegetated. These characteristics made it difficult to develop a rating curve. However, several larger storm events, including the October 2005 flood, provided much needed data to calibrate rating curves at and beyond bank full flow. As with the station located at W7/Glendola Road, the strategic location of this site outweighed the less-than-ideal physical characteristics of the stream corridor.

**W9 – “Hurley’s Pond Dam”, Hurley’s Pond Road, Wall Township:** The datalogger is mounted to the upstream face of the culvert/bridge at the outlet of the pond. The outlet structure functions as a weir, orifice and finally another weir during overtopping of Hurley’s Pond Road. Hydraulics of these structures are well documented and dimensions are easily measured. Also, a prior study of this drainage area was available (Hatch-Mott McDonald, July 2004. Dam Evaluation Report Phase II for Monmouth County Engineering Department) which aided the investigators by providing comparative data. Vehicle parking is close by. Hurley’s Pond Road does experience significant traffic, and the bridge is a narrow point on the road, making safety a priority in data collection from the logger. The outlet to the pond is a natural control point and is strategically located in the upper reaches of the Wreck Pond Brook Branch.

**W7 – “Wreck Pond Brook at Glendola Road, Wall Township”:** This site is located on the wooden bridge crossing of Glendola Road and Wreck Pond Brook. The bridge is a natural hydraulic control point. Glendola Road is a

dead end street with very little traffic. It serves a small community of horse farms and thus investigators felt that there would be little possibility of gage tampering. The gage was installed just downstream of the bridge opening, far enough to be beyond the influence of the opening itself. The channel is somewhat prismatic and the banks are covered with seasonally thick vegetation. Downstream the channel is somewhat straight but is interrupted by some vegetation. Although this location is ideal in terms of the overall subdivision of the watershed, some physical characteristics of the location were undesirable, such as thick organic deposits on the channel bottom and the interruption of the channel downstream by vegetation. This stretch of Wreck Pond Brook is somewhat sluggish and prone to deposits. Further downstream a farm pond discharges to the brook, which then runs through a large culvert under 18<sup>th</sup> Avenue. Investigators felt that the strategic location within the watershed took precedence over other factors which could be accounted for in data collection and modeling.

**W1 – “Wreck Pond Brook at Waterford Glen, Rt. 35, Wall Township”:** W1 is just downstream of Osborne’s Pond, a major hydraulic control structure on Wreck Pond Brook. Access to the site is from the Waterford Glen parking lot. The stream channel in this location is fairly prismatic with a free flowing water surface and somewhat stable bed. The channel is bounded by a large, heavily vegetated floodplain. Data collected from this station proved to be very consistent and showed an excellent “shape” in the hydrographs, primarily due to the influence of the pond directly upstream. Investigators considered locating the meter just downstream of Osborne’s Pond at Allaire Road (a few hundred feet upstream from the final location). However, this is a popular location for fishermen which raised concerns about possible tampering with the gage.

## **HANNABRAND BROOK STATIONS**

**W5 – “Hannabrand Brook at Bailey’s Corner Road”:** W5 is the most upstream gauge on Hannabrand Brook. Investigators evaluated several sites further upstream but found that flows were small and would be difficult to reproduce in a modeling environment. Initially investigators sought to install the meter on the bridge crossing of Bailey’s Corner Road, a natural control point. However, the bridge is on a road bend, and experiences high traffic volume which rendered the location unsuitable due to safety concerns. The investigators located the meter approximately 100 feet downstream of the bridge. This location provided a prismatic cross section, free flowing water surface and safe access. Unfortunately, this location also experienced severe stream bed movement which, on several occasions, buried the meter in sands and gravels. The meter continued to function and recorded water depth measurements. However, these measurements required adjustment to account for increased sediment depth and artificial elevation of the water

surface. Data used in modeling were taken from the records prior to bed movement.

**W2 – “Hannabrand Brook at Old Mill Road” and W3 – “Wreck Pond Brook at Old Mill Road”:** These locations represent the most downstream gauge locations in the watershed determined to be above the influence of tide and backwater effects. Originally a single downstream location was selected to measure the entire watershed (W4 at Shore Road) but was abandoned after severe flooding and “backwater” were observed due to a 2-inch rainfall event. Each site has safe access, and somewhat uniform, prismatic cross section. Drawbacks to these sites which later proved difficult in the modeling process (see Section 6) include the location of Old Mill Pond directly upstream of W3 and the short channel between W3 and the Old Mill Road Culvert. For station W2, the gage (datalogger) was located upstream of the Old Mill Road culvert on the Hannabrand Branch due to the inability to gain permission for access on the property directly below the culvert. Upstream of W2, the channel winds and bends and lastly, the area between the Old Mill Pond spillway and the upstream portion of the Hannabrand overflow and flows co-mingle during extreme events (such as October 2005). Never the less sufficient logger data, complimented by photographic data by residents in the area allowed for successful stream modeling and subsequent development of rating curves.

## **BLACK CREEK STATION**

**W8 – Rt. 71 Culvert at headwaters of Black Creek, Spring Lake Heights:** The last drainage area which contributes to Wreck Pond and appears to be uninfluenced by tides or backwater during normal storm events is that which is occupied by the Spring Lake Golf Club, the Mews Golf Club and the surrounding neighborhoods. A logger was initially attached to the weir at the water course /pond outlet at the Spring Lake Golf Club (SLGC) which would have been an ideal location strategically and hydraulically. Unfortunately, the wooden weir and associated bulkhead is in significant disrepair and consequently is leaking badly and allowing enough bypass flow which the investigators felt could not be easily accounted for. The bulkhead was patched successfully in one main location, but too many other areas were leaking. Therefore, the gage was relocated to the downstream side of the Rt. 71. The channel in this location is shallow and surrounded by steep slopes. The embankments are composed of dumped concrete debris and vegetation. The channel downstream of the logger is short before it enters the ponded area of Black Creek. Flows are easily measured in the channel, and the channel is fairly prismatic. This location allowed the investigators to observe the influence of the Rt. 71 drainage and its interaction with the drainage area upstream of the SLGC weir which would have been undetected had the logger been left installed on the SLGC weir.