WILLIAM KENNY ASSOCIATES
LANDSCAPE ARCHITECTURE ▪ ECOLOGICAL SERVICES

May 13, 2022

Woodbridge Inland Wetlands Agency
Woodbridge Town Hall
11 Meetinghouse Lane
Woodbridge, Connecticut 06525

Re: Wetland Functions Supplement Assessment
10 & 14 Merritt Avenue, Woodbridge, Connecticut

Dear Members of the Agency:

Based on comments provided by the Agency and Town Consultant, William Kenny Associates LLC (WKA) has prepared this letter to supplement the wetland and watercourse functional assessment findings provided in our report entitled *Wetland Impact Assessment*, dated April 12, 2022. We have provided additional information to describe the methods used and results in the *Wetland Functions and Values: Existing versus Proposed Conditions* section of the report. This letter is specific to the assessment of wetland and watercourse functions. Please refer to the April 12, 2022, report for detail regarding the assessment of conditions in the Regulated Upland Review Area (RURA) and the conclusion that the wetlands will not be adversely impacted to due activity within the RURA.

Methodology

The biophysical elements (e.g., landscape position, geology, hydrology, substrate and vegetation) of wetlands determine their functions and to what capacity they are performed. The functions they provide and the capacity of those functions vary from wetland to wetland. To better understand these differences as they relate to the West River and three isolated wetlands, a functional evaluation was completed based, in part, on *A Rapid Assessment Procedure for Assessing Wetlands Functional Capacity* (Hollens and Magee 1998). This method assesses the relative ability of the wetlands for performing functions and provides a logical framework for observations, a structure for standardizing results and a basis for achieving repeatable results among users. The classification system utilized to evaluate the functionality is based on the biophysical characteristics of the wetlands, which is primarily a function of landscape position and associated hydrology. Though differing vegetative cover types may be present within each of the wetland, the functionality of the wetlands was assessed from a broader "macro-scale" perspective, and the three isolated wetlands were evaluated as a whole, as opposed to segmenting them into smaller units. The small shifts in vegetative cover types over relatively small areal extents within the wetlands do not affect the overall functioning of the wetlands as much as the location, shape and associated hydrologic position of the wetland.

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Results - Summary

The West River and three isolated wetlands were assessed to determine their capacity to provide seven wetland functions and were compared to the anticipated capacity to provide wetland and watercourse functions following the implementation of the proposed project. The following is a listing of each function and an indication of the relative ability of the wetland to perform each function before and after project implementation.

Table One: *Wetland Functions: Existing versus Proposed Conditions*

WETLAND & WATERCOURSE FUNCTIONS	*RELATIVE CAPACITY TO PERFORM FUNCTION*	
	EXISTING	*PROPOSED*
WEST RIVER & FLOODPLAIN WETLAND FRINGE		
Modification of Groundwater Discharge	*HIGH*	*HIGH*
Modification of Groundwater Recharge	*LOW*	*LOW*
Storm and Flood Water Storage	*LOW-MODERATE*	*LOW-MODERATE*
Modification of Water Quality	*LOW*	*LOW*
Export of Detritus	*HIGH*	*HIGH*
Contribution to Abundance and Diversity of Wetland Flora	*LOW-MODERATE*	*LOW-MODERATE*
Contribution to Abundance and Diversity of Wetland Fauna	*MODERATE*	*MODERATE*
ISOLATED WETLANDS		
Modification of Groundwater Discharge	*LOW*	*LOW*
Modification of Groundwater Recharge	*MODERATE*	*MODERATE*
Storm and Flood Water Storage	*MODERATE*	*MODERATE*
Modification of Water Quality	*MODERATE*	*MODERATE*
Export of Detritus	*LOW*	*LOW*
Contribution to Abundance and Diversity of Wetland Flora	*LOW-MODERATE*	*LOW-MODERATE*
Contribution to Abundance and Diversity of Wetland Fauna	*MODERATE*	*MODERATE*

The comparison of the existing wetland and watercourse functions and the anticipated wetland and watercourse functions following implementation of the proposed project revealed that the existing wetland functions will be maintained.

Results - Narrative

The following is a general description of each function, its potential societal value and an assessment of the river and isolated wetlands. The capacity for the river and wetlands to perform

the wetland functions varies from wetland to wetland and from function to function. The differences are due to natural (hydrogeomorphic) and human (e.g., past and current land use activities) conditions.

Modification of Groundwater Discharge:

Modification of groundwater discharge is the capacity of a wetland to influence the amount of water moving from the ground to the surface. Typically, a perennial inlet and outlet indicate that a wetland is directly linked with the regional water table and has a high capacity to perform this function. This can affect groundwater and surface water supplies and recreational activities.

The West River has a high capacity to influence the amount of water moving from groundwater to surface water within the river due to the perennial inlet and outlet. The proposed project will not alter this function as the segment of the river within the site will continue to flow as it does today (e.g., no proposed dams, water drawn down or altering of the riverbanks and bed).

The isolated wetlands have a low capacity to influence the amount of water moving from groundwater to surface water due to their landscape position along a relatively level area and morphological conditions (i.e., a gentle slope with depressional areas). The proposed project will not alter this function as the landscape position and shape of the wetlands will not be impacted by the project.

Modification of Groundwater Recharge:

Modification of groundwater recharge is the capacity of a wetland to influence the amount of surface water moving to groundwater aquifers and thereby affecting public and private groundwater supplies. The subsoil and location of a site play a significant role in the ability of wetlands to modify groundwater recharge. With the exception of slope wetlands, all wetlands have some capacity to contribute to this function. Poorly developed or no microrelief is an indication that the water table is below the substrate of a wetland for most of the growing season and that groundwater recharge is occurring. Wetlands with perennial outlets are discharge areas and cannot be recharge areas, even seasonally.

The West River has a low capacity to influence the amount of water moving from surface water to groundwater due to the perennial outlet. The proposed project will not alter this function as the segment of the river within the site will continue to flow as it does today (e.g., no proposed dams, water drawn down or altering of the riverbanks and bed).

The isolated wetlands have a moderate capacity to influence the amount of water moving from surface water to groundwater due to their landscape position along a relatively level area and morphological conditions (i.e., a gentle slope with depressional areas). The proposed project will not alter this function as the subsoil, location and shape of the wetlands will not be impacted by the project. Surface water will continue to enter these wetlands via precipitation and sheet flow from the Wilbur Cross Parkway Right-of-Way (the largest source) and developed and undeveloped onsite areas (a secondary source). Groundwater within the wetlands will continue

to ultimately discharge to the proximate river. The majority of surface water and shallow subsurface water within the project area flows towards the river. This condition will be replicated via the proposed stormwater management system which will collect, treat and direct stormwater to the river in the northwestern portion of the site. More than 90 percent of collected stormwater runoff will infiltrate the ground. From there, the water will flow to the river as groundwater. A smaller portion of the site drains towards the isolated wetlands (portions of proposed Lots 9, 10, 13 and 14 and areas proposed to remain undeveloped in the eastern portion of the site). Waterflow from these areas, under existing conditions, accounts for an insignificant amount of the water that maintains these wetlands. The critical waterflow to these wetlands and the reason for their existence is stormwater runoff from the Wilbur Cross Parkway. This project will not affect this waterflow. The onsite soils have a very high infiltration rate due to an abundance of sand and gravel. Stormwater runoff from these soils occurs during less than five percent of storm events (only for precipitation depths greater than about two inches). As such, the capacity of the wetlands to provide groundwater recharge will not be impacted by the proposed project.

Storm and Floodwaters Storage:

Storm and floodwater storage is the capacity of a wetland to detain or retain stormwater on its surface. This benefits society by preventing storm damage and the loss of life and property. All wetlands, except slope wetlands, have some capacity to contribute to this function. Depressional wetlands have the highest potential for providing this function.

The West River has a low to moderate capacity to store stormwater and floodwater. The banks of the river allow for some water storage; however, the perennial flow of the river limits the ability of the river to provide protection to downstream resources. The shape and flow of the river will not be altered by the project and as such the river's capacity to provide this function will not be altered.

The isolated wetlands have a moderate capacity to store stormwater and floodwater. Overall, the isolated wetlands' morphologic conditions are that of a gentle slope with some internal depressions present and areas of the wetlands are vegetated, which slows down and detains water flows. These conditions will not be altered with the proposed project and as such, the capacity to provide this function will not be impacted.

Modification of Water Quality:

Modification of water quality is the removal of suspended and dissolved solids from surface water and dissolved solids from groundwater and conversion into other forms, plant or animal biomass or gases. This function may contribute to societal values related to public water supply, recreation and aesthetics. The primary mechanisms for the removal of suspended solids are sedimentation and filtration. Dissolved constituents can be removed or made unavailable for downstream plant use via adsorption and absorption by soil particles, uptake by vegetation, loss to the atmosphere by microbiological processes or a combination of the three. Flow characteristics and residence time are the primary wetland characteristics affecting the ability of

a wetland to perform this function. Generally, depressional, lacustrine fringe and flat wetlands have the highest potential for performing this function because typically the residence time of water is maximized. Conversely, slope wetlands have the least potential.

The West River has a low capacity to modify water quality due to the perennial flow and low residency time. The capacity of the river to provide this function will not be impacted by the project as the flow of the river will not be altered.

The isolated wetlands have a moderate capacity to modify water quality. The morphologic condition is that of a gentle slope with internal depressions and areas of the wetlands are vegetated, which slows down water flows and allows for sedimentation, filtration, adsorption and absorption. The shape and vegetation within the wetlands will not be altered with the proposed project and thus the capacity to provide this function will not be impacted.

Export of Detritus:

Export of detritus refers to the ability of the wetland to produce and export dissolved and particulate organic particles to downstream aquatic ecosystems to serve as an energy source, to support their food chain or both. Society may value this function as it relates to food web support and ultimately nature research and education, recreation (e.g., hunting and fishing) and the type and density of fauna supported by the wetland. The structure and composition of the wetland's vegetation affect the production of detritus and the degree of the wetland's surface water connection with a stream, river or lake affects the transport of detritus. An increase in the productivity and diversity of an ecological community generally equates to a greater capacity to perform this function. Based on hydrogeomorphic conditions, riverine wetlands have the greatest potential for the export of detritus due to an unrestricted outlet. Depressional and flat wetlands have the least potential because of their greater potential to retain suspended sediments.

The West River has a high capacity to export organic detritus from the wetland to the adjacent and downstream aquatic ecosystems due to its unrestricted outlet and preservation of trees along the river. This will not be altered with the proposed project and thus the capacity of the river to provide this function will not be impacted.

The isolated wetlands have a low capacity to export organic detritus from the wetland to the adjacent and downstream aquatic ecosystems due to the morphological conditions of a gentle slope with depressional areas and lack of a significant surface connectivity to watercourses. The isolation and shape of the wetlands will not be altered with the proposed project and thus the capacity of the wetlands to provide this function will not be altered.

Contribution to Abundance and Diversity of Wetland Vegetation:

Contribution to abundance and diversity of wetland vegetation is related to the number and type of hydrophytic plants that a wetland can produce and support. Society may value this function as it relates to environmental research and education, recreation, the type and density of fauna supported by the wetland and production of harvestable goods. Because wetlands support plant

species that occur in wetter and dryer (upland) habitats and species that grow only in wetland habitats (poorly drained and very poorly drained soils), most wetlands have a high capacity to contribute to the abundance and diversity of a landscape's vegetation. The primary variables affecting a wetland's capacity to perform this function are its plant species diversity, its vegetation density and dominance, its water regime diversity and its juxtaposition to other wetlands.

The West River has a low to moderate capacity to contribute to the abundance and diversity of wetland flora. The floodplain wetland along the river is very narrow and supports a low diversity and abundance of hydrophytic (i.e., wetland) vegetation. The proposed project will not alter the extent of the floodplain wetland nor the vegetation within the wetland. A split rail fence, enhancement planting and invasive vine control is proposed bordering the floodplain wetland and will provide protection to the wetland and river in the long-term. As such, the capacity of the river and wetland to provide this function will not be adversely impacted.

The isolated wetlands have a low to moderate capacity to contribute to the abundance and diversity of wetland flora. Although the wetlands have some areas dense with vegetation, the dominance of invasive vines and woody and herbaceous vegetation able to persist in both wetland and upland areas significantly diminishes the wetlands' capacity to support a diversity and abundance of hydrophytic (i.e., wetland) vegetation. The proposed project will not alter the vegetation within the wetlands and will provide a split rail fence, enhancement planting and invasive vine control within the wetland buffers. As such, the capacity of the wetlands to provide this function will not be adversely impacted.

<u>Contribution to Abundance and Diversity of Wetland Fauna:</u>

Contribution to the abundance and diversity of wetland fauna is the capacity of a wetland to support large and/or diverse populations of animal species that spend part or all of their life cycle in wetlands; either an individual wetland or a system or network of wetlands. Society may value this function as it relates to environmental research and education, recreation, aesthetics, and providing a source of food. A wetland's water regime is the primary factor affecting this function, as it largely controls the dominant vegetation type present and influences the animal movement to and within the wetland to food, cover and breeding areas. Other factors affecting the capacity of a wetland to contribute to the abundance and diversity of wetland fauna are the structure and composition of the vegetation community and the juxtaposition of the wetland to other habitat types (e.g., another wetland, upland forest, farm field, surface waterbody, etc.).

The West River has a moderate capacity to contribute to the abundance and diversity of wetland fauna. This segment of the river is likely to provide spawning habitat for anadromous fish species such as alewife. The vegetation within the bordering floodplain wetland is relatively low and limits the habitat opportunities for wetland wildlife. However, the tree canopy over the river provides breeding and foraging opportunities for birds. The tree canopy adjacent to the river will be preserved with the proposed project and thus the capacity of the river and wetland to provide this function will not be impacted.

The isolated wetlands have a moderate capacity to contribute to the abundance and diversity of wetland fauna. Although the wetlands provide habitat opportunities for generalist species, the dominance of invasive vegetation limits the abundance and diversity of wetland fauna that utilizes wetland flora for habitat opportunities. The wetlands were also assessed for the potential to provide habitat for vernal pool obligate species (i.e., species that require vernal pools to complete their breeding cycle). Five vernal pool investigations were conducted from March to April 2022. This timing corresponds with the breeding season for vernal pool obligate species. No vernal pools were identified due to an absence of required hydrologic conditions and no vernal pool obligate species were found. Vernal pools require contained areas of persistent standing water from approximately March to June to support species development. During our investigations, relatively small and intermittent depressional areas with shallow water depths were observed. These conditions do not provide suitable breeding habitat and no breeding activity was observed. The vegetation and morphologic and hydrologic conditions within the wetlands will not be altered and as such, the capacity for the wetlands to provide for this function will not be impacted.

Conclusions

We have provided supplemental information used to prepare the wetland and watercourse functional analysis from our April 12, 2022, *Wetland Impact Assessment* report. Based on this assessment, we conclude that the capacity of the West River and isolated wetlands to provide typical wetland functions will be maintained following project completion. Thank you for your consideration of this information. If you should have any questions or comments, please do not hesitate to contact us at (203) 366-0588.

Sincerely,

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Principal

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