

**Urban Resource Recovery: Pneumatic Flow Tube Technology Event (URR.6)**  
**(CDW Working Group is now URR Working Group)**  
**February 26, 2021, from 10:00 a.m. to Noon**  
**Via Microsoft Teams**

*This event will be recorded for posting to the Town+Gown:NYC webpage.*

- 10:00—10:10 a.m. Introduction and Overview of Urban Resource Recovery Working Group**  
Terri Matthews, Director, Town+Gown:NYC
- 10:10—10:30 a.m. Rutgers Center for Advanced Infrastructure and Transportation's Infrastructure Resilience Program**  
Professor Daniel Barone, Rutgers University, School of Environmental and Biological Studies, Department of Marine and Coastal Sciences
- 10:30—11:00 a.m. Introduction to the Maritime Asset Management System (MAMS)**  
W. Scott Douglas, Dredging Program Manager, Office of Maritime Resources, New Jersey Department of Transportation  
Professor Yun Bai Rutgers University, School of Engineering, Center for Advanced Infrastructure and Transportation
- 11:00—11:30 a.m. Introduction to the Pneumatic Flow Tube Mixing (PFTM) Technique for Efficient and Cost Effective Stabilization and Beneficial Use of Soft Marine Sediments**  
  
W. Scott Douglas, Dredging Program Manager, Office of Maritime Resources, New Jersey Department of Transportation  
Professor Robert Miskewitz, Rutgers University, School of Environmental and Biological Studies, Department of Environmental Sciences
- 11:30 a.m.—Noon Discussion**

**Introduction.** At the October 30, 2018 symposium event, [Pushing the Recycling Envelope: Construction and Demolition Waste.2](#), Town+Gown first piloted knowledge co-creation sessions to engage in “real time” co-creation of knowledge to identify what we know and what we don’t know on a particular topic and what need to know to make changes in practice and policy based on research. After years of conducting research, disseminating research results in *Building Ideas* and holding symposium events to reflect on results and move them toward action, Town+Gown needed a mechanism to accelerate the action research cycle and move Town+Gown’s work to the “thought leader” stage and toward a more systemic form of decision-making. The co-creation sessions led to the creation of Town+Gown’s first working group—the Construction+Demolition Waste (CDW) working group—within which Town+Gown could provide an architecture for intentional, targeted intentional research projects focused on the identified research gap and increase academic synthesis and translation of the results to serve as useful applied research resources for policy makers.

The Urban Resource Recovery (URR) working group is focused on supporting applied research and innovative policy design to close construction material loops. The URR has developed a Closing Loops City Program (CLCP) that initially focuses on recycled concrete aggregate, glass pozzolan and soil, with biosolids and other materials to follow and leverages the City’s capital program to increase the re-use of CDW generated on City capital projects on other capital projects. The CLCP is under review by the City agency members, and work on specific work flows, such as preliminary CDW volume data collection and material specifications identification and review, has begun.

At this event, academics from Rutgers will present on technology developed at Rutgers that permits beneficial re-use of moderately contaminated sediments dredged closer to the shore. In addition, there will be a presentation on Rutgers Maritime Asset Management System (MAMS), a decision-support tool, and a panel discussion among practitioners about this technology and model, as a foundation for considering the introduction of this recovered urban resource in the CLCP initiative.

**Foundational Survey NYS DEC 360 Series Regulations.**<sup>1</sup> New York State's "360 Series Regulations" (the "Part 360 regulations") promulgated by the New York State Department of Environmental Conservation (NYS DEC) cover the beneficial use of recovered urban resources generally. Navigational dredge material (NDM), brine, and fill material are covered in Sections

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<sup>1</sup> This foundation survey is intended as general background information about NYS DEC's applicable 360 regulations as they may apply to the topics covered by today's event discussion.

360.12(e) and 360.13 of the Part 360 regulations.<sup>2</sup> Section 360.12 (e) (1) provides for case-specific beneficial use determinations for navigational dredged materials (NDM), specifically upland management of NDM in a beneficial manner, but does not apply to NDM management in surface water, or in the riparian zone, or to the upland management of NDM if it is included under a dredging permit or other applicable permits specified in section 360.2(a)(4)(xi) of the Part 360 regulations.<sup>3</sup>

The Part 360 regulations provide for two predetermined beneficial uses.<sup>4</sup> The first is Section 360.12(c)(1)(iv) for NDM used outside ecologically sensitive areas, as commercial aggregate in place of sand or gravel if the NDM contains at least 90 percent sand and gravel, as determined by a standard grain size analysis method approved by the department and performed by an independent laboratory, and if the NDM contains less than 0.5 percent total organic carbon. The second is Section 360.12(c)(3)(ix) for clay, till, or rock excavated as part of navigational dredging, which is separated from overlying navigational dredged material and used as fill or aggregate. Additionally, facilities that handle, store and/or process NDM and receive NDM for the purpose of amending the NDM with portland cement, or for the purpose of dewatering on pads or in enclosed geotextile tubes, do not require a permit but can register with NYS DEC under Sections 361-9.1 of Subpart 361-9.<sup>5</sup>

If, however, the pre-determined beneficial use categories or the facility approach discussed above are not available for some potential uses, there is also a process for a case-specific NDM beneficial use determination petition, conforming to requirements, submitted to NYS DEC, and NYS DEC will determine in writing, on a case-specific basis, whether the proposal constitutes a beneficial use, based on requirements described in this section. A permit may be required for a facility not covered by registration provisions in Subpart 361-9. For use of NDM as general fill

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<sup>2</sup> See

[https://govt.westlaw.com/nycrr/Document/Id4d60809dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/Id4d60809dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)).

<sup>3</sup> See, for this discussion,

[https://govt.westlaw.com/nycrr/Document/Id4d60809dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/Id4d60809dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default))

<sup>4</sup> See

[https://govt.westlaw.com/nycrr/Document/Id4d60809dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/Id4d60809dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)).

<sup>5</sup> See

[https://govt.westlaw.com/nycrr/Document/Id4d67d23dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/Id4d67d23dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)) and

[https://govt.westlaw.com/nycrr/Document/Id4d67d26dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/Id4d67d26dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)); the requirements

contained in Part 360 would also apply.

or cover, the requirements of Section 360.12(d)(3)(vi) must be met,<sup>6</sup> except where NDM will meet criteria for and will be used in the same manner as restricted-use or limited-use fill material as described in Section 360.13 discussed below. NDM approved for beneficial use under this section ceases to be a waste when it meets the technical requirements or specifications for the intended end use, provided it is not stored for longer than 365 days after meeting the technical requirements or specifications, unless otherwise approved by the department. There are also requirements for sampling protocol and analytical methods to support the petition. With NYS DEC approval, sampling from previous events and for other purposes can be used in place of sampling according to Section 360.12(e) requirements.

Section 360.13 covers special requirements for pre-determined beneficial use of fill material and applies to the direct use of fill material under a pre-determined beneficial use.<sup>7</sup> Fill material ceases to be solid waste in accordance with the (1) restricted-use fill and limited-use fill - once delivered to the site of reuse; (2) general fill generated outside of the City of New York – once a determination that it is general fill has been made; (3) general fill generated within the City of New York - once delivered to the site of reuse. There is an exemption for on-site reuse of fill material.<sup>8</sup> Use of restricted or limited use fill material can only occur at a project in accordance with an approved local building permit or other municipal authorization that includes the need for the fill material. Fill material must be used within 30 days of arriving at the project site. If a foundation or pavement is not installed within 365 days of fill material placement, its placement will constitute prohibited disposal. Fill material not used in accordance with this section is a solid waste and must be managed at a facility authorized to receive it, or used pursuant to a case-specific beneficial use determination in accordance with section 360.12(d). There are also testing requirements and sampling and analysis requirements for fill material. And, among other fill material use criteria, a person must not receive payment

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<sup>6</sup> NYS DEC determines that the use constitutes a beneficial use only if at the point of beneficial use, the waste will not require decontamination or other processing. See [https://govt.westlaw.com/nycrr/Document/Id4d60809dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/Id4d60809dfe911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)).

<sup>7</sup> See [https://govt.westlaw.com/nycrr/Document/Id4d6080cdf911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=\(sc.Default\)](https://govt.westlaw.com/nycrr/Document/Id4d6080cdf911e7aa6b9b71698a280b?viewType=FullText&originati onContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)). This section does not apply to: (1) fill material sent to facilities subject to regulation under Subpart 361-5 of this Title; and (2) fill material generated outside of New York City with no evidence of historical impacts such as reported spill events, or visual or other indication (odors, etc.) of chemical or physical contamination as identified in section 360.12(c)(1)(ii) of this Part.

<sup>8</sup> Fill material used as backfill for the excavation from which the fill material was taken, or as fill in areas of similar physical characteristics on the project property is exempt from regulation under this Part. If fill material exhibits historical or visual evidence of contamination (including odors), and will be used in an area with public access, the relocated fill material must be covered with a minimum of 12 inches of soil or fill material that meets the criteria for general fill, as defined in this Part. This provision does not apply to sites which are subject to a department-approved or undertaken program pursuant to Part 375 of this Title.

or other form of consideration for allowing beneficial use of restricted-use fill or limited-use fill material on land under that person's control.

The Part 360 regulations also have regional aspects. The transport of fill material that originates in the City of New York is subject to the requirements of Part 364 of this Title; transport of limited-use fill and restricted-use fill generated outside of New York City, is subject to the requirements of Part 364 of this Title, and limited-use fill and restricted-use fill generated outside of Nassau and Suffolk counties is prohibited from being transported to any destination within Nassau or Suffolk County.

More detailed information about testing materials is in Appendix A.

## Presenter Biographies

**Yun Bai** is a Research Assistant Professor at the Center for Advanced Infrastructure and Transportation (CAIT). Dr. Bai's expertise lies in transportation systems modeling and infrastructure management and her research applies state-of-the-art operations research, data and management science methodologies to solve engineering problems in logistics systems and infrastructure management. She is specialized in mathematical modeling and algorithm design for solving complex, large-scale optimization problems as well as data analytics in transportation asset management, such as deterioration modeling, life cycle cost analysis, capital planning. She is also experienced in developing data management platforms and decision support tools for supply chain, highway, transit and maritime infrastructure systems. At CAIT, Dr. Bai has completed and is currently leading a number of research projects, sponsored by FHWA, NJDOT, USDA, NJ TRANSIT, among others.

**Daniel Barone** is a jointly-appointed Associate Research Professor within the Rutgers University Department of Marine and Coastal Sciences (DMCS), Center for Advanced Infrastructure and Transportation (CAIT), and Department of Geography. He holds Bachelor's and Master's degrees in Marine Science and Instructional Technology from Stockton University and a PhD in Physical Geography from Rutgers University. Dr. Barone has over 15 years of experience addressing coastal resilience issues related to beach-dune storm vulnerability, maritime transportation, coastal floodplain mapping, and beneficial use of dredged material. He utilizes spatial data analysis, remote sensing, and coastal modeling techniques to solve complex coastal problems and present solutions to various audiences. Dr. Barone is also a Certified Floodplain Manager (CFM) and Geographic Information Systems Professional (GISP).

**W. Scott Douglas** is the Dredging Program Manager of the NJDOT Office of Maritime Resources. He is responsible for overseeing dredging and dredged material management statewide, including maintaining the 200 nautical mile state channel network along the Atlantic and Delaware Bay coasts. Mr. Douglas has been actively involved in sediment issues in New Jersey since 1990, was on the front lines of the dredging crisis in the NY/NJ Harbor, and was a key player on the team that delivered the 50 foot deepening. His primary responsibility since October of 2012 has been the recovery of New Jersey's Marine Transportation System from the impacts of Superstorm Sandy. Mr. Douglas holds a BS in Zoology and an MS in Environmental Toxicology from the University of VT, has presented at numerous conferences and seminars throughout the US and abroad, and has published over 20 peer-reviewed papers on contaminated sediments and dredged material management.

**Robert Miskewitz** has a BS in Biology from Penn State University and both an MS and PhD from Stevens Institute of Technology, New Jersey in the joint Environmental / Coastal Engineering Program. His doctoral dissertation research focused upon modeling the migration of persistent organic pollutants in stabilized sediment. Robert is currently an Associate Research Professor at Rutgers University, New Jersey in both the Departments of Civil and Environmental Engineering and Environmental Science as well as a member of the Center for Advanced Infrastructure and Transportation (CAIT). He manages a research group that operates the Weeks Sediment Laboratory at Rutgers University. He has over twenty years of experience conducting research to develop technologies to identify environmental impacts to water and waterway infrastructure resulting from emerging stressors using innovative monitoring and simulation techniques, and to design sustainable infrastructure solutions. Specific areas of research where he is currently engaged include beneficial reuse of contaminated dredged sediment, water and sediment quality in coastal and estuarine systems, Marine and Coastal Infrastructure Resilience.

- Testing requirements for Case Specific Beneficial Use Designation for NDM under Section 360.12 (e) (4) are below:

(4) Sampling protocol and analytical methods. In support of a petition for a beneficial use determination, the petitioner may submit analytical results generated for another purpose, including ‘in-situ’ sediment sampling performed in support of a State or Federal permit to dredge, which may not conform to the sampling described in this paragraph.

(i) Untreated, unamended NDM and treated or amended NDM must be analyzed for the following parameters, unless otherwise approved by the department,, using department-approved analytical methods: volatile organic compounds; semivolatile organic compounds; pesticides; polychlorinated biphenyls; metals; sulfides; salt content; grain-size distribution; chlorinated dioxins/furans; carbazole; mirex; hexavalent chromium and cyanides. In addition, the department may require the submission of Synthetic Precipitation Leaching Procedure (EPA SW-846 Method 1312) or Toxicity Characteristic Leaching Procedure (EPA SW-846 Method 1311) results, as incorporated by reference in section 360.3 of this Part, and other data needed to justify the proposed end use (*e.g.*, nutrient content, geotechnical testing, etc.).

(ii) The NDM must be analyzed as prescribed in the following table unless otherwise approved by the department. If the source of the NDM has a history of significant contamination or highly variable contamination, additional sampling will be required. The sampling plan must be submitted and approved by the department prior to sampling the NDM.

TABLE: Analyses Required for NDM

Cubic Yards of NDM	Minimum Number of Analyses
Under 5,000	1 for each 1,000 Cubic Yards
5,000-10,000	6
10,000-20,000	7
20,000-30,000	8
Over 30,000	*

\*The department will require a project-specific approved sampling frequency.

(iii) All samples taken must be representative of the NDM that will be used. A written record of all sampling details must be submitted to the department and must include the date, location, and protocol used to obtain representative samples.

(iv) Statistical analysis in accordance with USEPA SW-846, as incorporated by reference in section 360.3 of this Part, may be used to justify compliance of NDM with contaminant limits where results show an exceedance. If the pollutant limit for beneficial use is lower than the required detection limit, an analytical result less than the required detection limit will be considered to comply with the pollutant limit.

- Requirements, including testing, for predetermined beneficial use of fill material under Section 360.13 (d)-(f) are below:

(d) Testing requirements for fill material.

Fill material that is not otherwise excluded or exempt from regulation under this section must be sampled and analyzed pursuant to subdivision (e) of this section if:

(1) the fill material originates from a location within the City of New York unless the quantity of fill material does not exceed 10 cubic yards from one site and the 10 cubic yards or less of material does not contain historical evidence of impacts such as reported spill events, or visual or other indication (odors, etc.) of chemical or physical contamination;

(2) the fill material originates from a location outside the City of New York if:

(i) there is historical evidence of impacts such as reported spill events, or visual or other indication (odors, etc.) of chemical or physical contamination;

(ii) the fill material originates from a site with industrial land use as defined in section 375-1.8(g)(2)(iv) of this Title; or

(iii) if, during excavation, visual indication of chemical or physical contamination is discovered.

(e) Sampling and analysis requirements for fill material.

(1) Sample method and frequency. Samples must be representative of the fill material. The sampling program must be designed and implemented by or under the direction of a qualified environmental professional (QEP), using the table below as a minimum sampling frequency. Written documentation of the sampling program with certification from the QEP that samples were representative of the fill material must be retained for three years after the sampling occurs and must be provided to the department upon request.

TABLE 1: Minimum Analysis Frequency for Fill Material

Fill Material Quantity (cubic yards)	Minimum Number of Analyses for Volatile Organic Compounds, if Required	Minimum Number of Analyses for all other parameters
0-300	2	1
301-1000	4	2
1001-10,000	6	3
10,001+	Two for every additional 10,000 cubic yards or fraction thereof	One per every additional 10,000 cubic yards or fraction thereof

(2) Analytical parameters. Fill material samples must be analyzed for:

(i) the Metals, PCBs/Pesticides, and Semivolatile organic compounds listed in section 375-6.8(b) of this Title;

(ii) asbestos if demolition of structures has occurred on the site;

(iii) volume of physical contaminants, if present, based on visual observation; and

(iv) volatile organic compounds listed in section 375-6.8(b) of this Title, if their presence is possible based on site events such as an historic petroleum spill, odors, photoionization detector meter or other field instrument readings.

(3) Laboratory and analytical requirements. Laboratory analyses must be performed by a laboratory currently certified by the New York State Department of Health's Environmental Laboratory Approval Program (ELAP).

(f) Acceptable fill material uses.

Fill material can be beneficially used in accordance with table 2 below.

TABLE 2: Fill Material Beneficial Use

Fill Material Type	Fill Material End Use	Physical Criteria	Maximum Concentration Levels
General Fill	Any setting where the fill material meets the engineering criteria, for use, except: 1. Undeveloped land; and 2. Agricultural crop land. General Fill may also be used in the same manner as Restricted-Use Fill and Limited-Use Fill.	Only soil, sand, gravel or rock; no non-soil constituents.	Lower of Protection of Public Health-Residential Land Use and Protection of Groundwater in section 375-6.8(b) of this Title.
Restricted-Use Fill <sup>1</sup>	Engineered use for embankments or subgrade in transportation corridors, or on sites where in-situ materials exceed Restricted-Use Fill or Limited-Use Fill criteria. Must be placed above the seasonal high water table. May also be used in the same manner as Limited-Use Fill.	Up to 40 percent by volume inert, non-putrescible non-soil constituents. <sup>2</sup>	General Fill criteria except that up to 3 mg/kg (dry weight) total benzo(a)pyrene (BAP) equivalent. <sup>3</sup> No detectable asbestos. In Nassau or Suffolk County – BAP equivalent does not apply. Polycyclic aromatic hydrocarbons must not exceed Protection of Groundwater Soil Cleanup Objectives in section 375-6.8(b) of this Title.
Limited-Use Fill <sup>1</sup>	Engineered use under foundations and pavements above the seasonal high water table. <sup>4</sup> Placement in Nassau and Suffolk Counties is prohibited.	No volume limit for inert, non-putrescible non-soil constituents. <sup>2</sup>	General Fill criteria, except up to Protection of Public Health-Commercial SCOs for metals; up to 3 mg/kg (dry weight) benzo(a)pyrene equivalent is allowed. <sup>3</sup> No detectable asbestos.