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Statement of Undisputed Facts in Support of the Conservation Law Foundation's Petition for DEM to Perform Its Non-Discretionary and Mandatory Duty to Notify and Require RIPDES Permitting of Unpermitted Commercial, Industrial, and Residential Dischargers in the Mashapaug Pond Watershed in Providence County, Rhode Island

1. The Mashapaug Pond watershed [RI006017L-06, USGS HUC 01090004] is located in the Pawtuxet River basin, within an area locally known as Reservoir Triangle of Providence, Rhode Island. *See* R.I. Dep't of Envtl. Mgmt., Final Total Maximum Daily Load for Dissolved Oxygen and Phosphorus - Mashapaug Pond, Rhode Island (2007), https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=72360 (the "Mashapaug Pond TMDL"); *see also Conservation Law Foundation v. EPA*, Motion to Dismiss, Ex. 1, Dkt. 17-2 No. 1:15-cv-00165-ML-PAS, 5 (D.R.I. 2016).

2. Mashapaug Pond has a long history of development along its banks dating back as early as 1636. Situated in the southwest quadrant of Providence, the pond is now bounded by the city of Cranston on the west, Narragansett Avenue to the east, and Sinclair Avenue to the south. It is the largest freshwater lake in Providence. Mashapaug Pond TMDL at 1.

3. Mashapaug Pond's surface area is approximately 31 hectares (77 acres) with an average depth of about 3 meters (9.8 feet). Its sources of fresh water are inflow from Spectacle Pond, ground water, and stormwater. The Mashapaug Pond physical watershed, including Tongue Pond and Spectacle Pond, encompasses approximately 308 hectares (762 acres) of urban land with a ratio of approximately 2 acres of residential use to 1 acre of industrial use. *Id.*

4. The area surrounding Mashapaug Pond is entirely urban and essentially fully developed at the present time. *Id*. at 6, 42.

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5. Land uses in the storm drain contributing areas[1] adjacent to the pond range from 75.4 percent to 100 percent industrial. *Id.* Land uses in the direct runoff draining areas[2] range from 11.1 percent to 95.1 percent Industrial. *Id.*

6. The Mashapaug Pond watershed has an impervious cover of 61 percent.[3] Impervious cover is defined as land surface areas, such as roofs and roads, that force water to run off land surfaces, rather than infiltrating into the soil. R.I. Dep't of Envtl. Mgmt., Rhode Island Statewide TMDL for Bacteria Impaired Waters, Mashapaug Pond Watershed Description (2011) at 5, http://www.dem.ri.gov/programs/benviron/water/quality/swbpdf/mashpaug.pdf.

7. Runoff from urban activities, including industry and transportation, fertilization, domestic, wildlife waste, and atmospheric deposition has, and continues to, seriously degrade water quality in Mashapaug Pond. Degraded water quality impairs fish habitat and the use of Mashapaug Pond for contact[4] and non-contact recreation.[5] Urban runoff contains elevated concentrations of phosphorus which can cause excessive algae growth and potentially toxic algal blooms, loss of dissolved oxygen (DO) that results in fish kills, and loss of bio-diversity. Excess algal levels are also detrimental to the aesthetic value of Mashapaug Pond resulting in color, clarity, and odor problems caused by living and decomposing dead algae. Mashapaug Pond TMDL at 46.

8. The Department of Health (DOH) and the Department of Environmental Management (DEM) have advised people to avoid recreational activities in Mashapaug Pond because a blue-green (or cyanobacteria) bloom has been detected in the waters of the reservoir and pond. Press Release, R.I. Dep't of Health, Blue-Green Algae Bloom Found in Mashapaug

[1] Six storm drains discharge directly into Mashapaug Pond. *Id.* at 6.

[2] The areas immediately adjacent to the pond shore where no sewers or storm drains exist are assumed to drain directly into the Mashapaug Pond. *Id.* at 6.

[3] This is a level at which stormwater impacts are expected. R.I. Dep't of Envtl. Mgmt., Rhode Island Statewide TMDL for Bacteria Impaired Waters, Mashapaug Pond Watershed Description (2011) at 7, http://www.dem.ri.gov/programs/benviron/water/quality/swbpdf/mashpaug.pdf.

[4] Primary contact recreational activities are recreational activities in which there is prolonged and intimate contact by the human body with the water, involving considerable risk of ingesting water, such as swimming, diving, water skiing, and surfing. R.I. Admin Code § 25-16-25:7.

[5] Secondary contact recreational activities are recreational activities in which there is minimal contact by the human body with the water, and the probability of ingestion of the water is minimal, such as boating and fishing. *Id.*

Pond in Providence (Sept. 11, 2014), http://www.ri.gov/press/view/22893; *see also* Press Release, R.I. Dep't of Health, RIDOH and DEM Recommend Avoiding Contact with Mashapaug Pond; Lift Restrictions for Pleasure Lake (Sept. 12, 2017), http://www.ri.gov/press/view/31414.

9. Mashapaug Pond is on the Rhode Island 2006 303(d) List of Impaired Waters for hypoxia,[6] nutrients, and pathogens.[7] The primary nutrient of concern is phosphorus since it is the limiting nutrient for algae growth. Mashapaug Pond TMDL at 1.

10. The 2006 303(d) List of Impaired Waters places Mashapaug Pond in Group 1[8] for hypoxia or low dissolved oxygen, excess algal growth/Chl-a, phosphorus, and pathogens. *Id*. at 4.

11. The 2014 303(d) List of Impaired Waters identifies Mashapaug Pond (Waterbody ID Number RI0006017L-06) as impaired by excess algal growth, dissolved oxygen, phosphorus (total), PCB in fish tissue, and fecal coliform. It further identifies Mashapaug Pond as a Category 5 waterbody, meaning it is impaired/threatened for designated use(s) by a pollutant(s) and requires a TMDL. R.I. Dep't of Envtl. Mgmt., 2014 303(d) List of Impaired Waters FINAL (2015), http://www.dem.ri.gov/pubs/303d/303d14.pdf.

12. Inputs of water into Mashapaug Pond include precipitation, storm sewer drainage, direct overland runoff, and ground water. Mashapaug Pond is fed by groundwater discharging into the bottom and edges of the pond. The pond has one tributary, Mashapaug Brook, that enters from Spectacle Pond. Mashapaug Pond TMDL at 9.

13. Mashapaug Pond (RI0006017) and Mashapaug Brook (from the outfall at Spectacle Pond) are Class B waters.[9] *Id.* at 4.

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[6] In aquatic ecosystems, hypoxia is generally defined as a DO concentration of less than 2-3 milligrams of oxygen per liter of water (mg/l). Vertical profile sampling conducted during the 2001 water quality monitoring program has confirmed stratified DO and temperature conditions in Mashapaug Pond with dissolved oxygen concentrations less than 2 mg/L in the hypolimnion (lower layer). Mashapaug Pond TMDL at 1.

[7] The pathogen impairment for Mashapaug Pond was added to the 2002 303(d) list following review of initial fecal coliform data collected as part of the assessment for the phosphorus and dissolved oxygen TMDL. *Id*.

[8] Group 1 waterbodies are waters that are not meeting Rhode Island's Water Quality Standards (WQSs) and for which TMDL development is underway. *Id.* at 4.

[9] "These waters are designated for fish and wildlife habitat and primary and secondary contact recreational activities. They shall be suitable for compatible industrial processes and cooling, hydropower, aquacultural uses, navigation, and irrigation and other agricultural uses. These waters shall have good aesthetic value." *Id.* at 4.

14. The objective[10] of the Mashapaug Pond TMDL is to identify measures needed to restore the designated uses of Mashapaug Pond. *Id.* at 5.

15. The TMDL objectives will be met by meeting the following water quality goals: Reduce the average Total Phosphorus concentration in the pond to 20 ug/l; eliminate hypoxia (DO< 2 mg/l) in the hypolimnion to support propagation of fish and other animal life in the pond; reduce algal abundance (chlorophyll-a) to levels consistent with the designated uses, and; reduce wet weather fecal coliform elevations. *Id.* at 5.

16. The Mashapaug Pond TMDL was developed by DEM to addresses the water quality impairments associated with elevated phosphorus concentrations (low dissolved oxygen and excess algal growth/chl-a). *Id.* at vii.

17. These impaired uses include support of fish propagation and other animal life in Mashapaug Pond, and swimming. The identified cause of the impairment is excessive phosphorus loads that contribute to algae concentrations, which in turn contribute to low DO concentrations that impair fish and animal survival and cause loss of habitat. *Id.* at 5.

18. The phosphorus loads also contribute to the growth of blue-green algae species *Anabaena planctonica*, *Microcystis aeruginosa*, and *Aphanizomenon flos-aquae*, which have been identified as hazardous to humans (through skin contact), making Mashapaug Pond unsafe for swimming. *Id*.

19. Swimming in Mashapaug Pond is not safe because of heightened fecal coliform levels following rain storms. *Mashapaug Pond Do's and Don'ts*, R.I. Dep't of Envtl. Mgmt., http://www.dem.ri.gov/programs/benviron/water/quality/surfwq/pdfs/mashpond.pdf (last visited Sept. 13, 2018).

20. Analysis of carp and bass samples indicates that fish from Mashapaug Pond are not safe to eat. *Id.*

21. Some types of algae (cyanobacteria) found in Mashapaug Pond can produce toxins that can harm humans and animals. *Id.*

[10] The goal of the TMDL is to restore Mashapaug Pond and protect it from future degradation. Letter, U.S. Envtl. Prot. Agency, Response to Petition for Designation at 10 (Mar. 11, 2014), https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/RDALetterResponse.pdf.

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22. Under existing conditions, the WQSs for DO and phosphorus are not met in Mashapaug Pond. Mashapaug Pond TMDL at 12.

23. Average total phosphorus levels ranged from 30–50 ug/l during the summer of 2001[11] in violation of the state's water quality standards. During this same time period dissolved oxygen levels ranged from a low of 0 mg/l in the hypolimnion or bottom waters to 12 mg/l at the surface. *Id*. at 12.

24. Six storm drains convey stormwater runoff directly to Mashapaug Pond. Results from the empirical based load calculations by Tetra Tech (2001) indicate that these direct discharges contribute 22 percent of the total phosphorus loading to Mashapaug Pond. The source of pollution to these storm drains is runoff from non-point sources such as streets, parking lots, rooftops, and lawns. *Id.* at vii, 12-13.

25. Monitoring conducted by ESS also indicates that these same sources discharge significant fecal coliform concentrations during wet weather. *Id.* at viii, 12.

26. The 2001 ESS study concluded that the largest single phosphorus source (47 percent) to Mashapaug Pond is tributary flow entering from Spectacle Pond. *Id.* at viii, 13.[12]

27. Direct overland runoff from the surrounding watershed is 13 percent of the total phosphorus load. *Id.* at viii, 13.

28. Although the sources of phosphorus in runoff from storm drains and direct overland flow are nonpoint in nature, they are regulated as point sources and are considered controllable. In order to meet phosphorus reduction targets for these stormwater sources and to reduce wet weather fecal coliform concentrations, a combination of upland and end of pipe control structures to treat and reduce runoff volumes, land use management, and conservation efforts and source reduction within the watershed is recommended *Id.* at viii.

[11] Field monitoring was conducted by EPA contractor ESS during 2001 to collect water quality data for the TMDL. Mashapaug Pond TMDL at vii.

[12] Other sources include currently unregulated sources that contribute to the MS4 systems as well as sources discharging directly to Mashapaug Pond. Letter, U.S. Envtl. Prot. Agency, Response to Petition for Designation at 10 (Mar. 11, 2014), https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/RDALetterResponse.pdf.

29. The current Rhode Island water quality criteria are an instantaneous DO concentration of at least 5.0 mg/L at any point in the water column, and a 7-day mean water column concentration of at least 6.0 mg/L. *Id*. at 38.

30. The numeric target for DO in the Mashapaug Pond TMDL is a concentration equal to or greater than 2 mg/L in the hypolimnion. This target does not represent a violation of the DO criteria because it has been determined that under certain natural conditions, DO levels of 2.0 mg/l or less may occur in the waters of Mashapaug Pond. Analysis using a calibrated water quality model[13] of the pond determined that to achieve this target a 62 percent reduction in modeled existing phosphorus loads was necessary from storm drains and direct overland flow to the pond. *Id*. at 38.

31. The applicable WQSs mandate that "Average Total Phosphorus shall not exceed 0.025 mg/L in any lake, pond, kettle hole or reservoir." *Id*. at 4.

32. The TDML determined that the standard for total phosphorus (0.025 mg/L) was exceeded in 23 of the 26 samples collected at stations MP-1 and MP-2 on seven different dates during the summer of 2001. Total phosphorus at the two stations had an average value of 0.039 mg/L, a minimum of 0.022 mg/L, and a maximum of 0.086 mg/L. *Id*. at 19.

33. The numeric water quality target for total phosphorus is set at 20 ug/l—the annual mean concentration associated with these load reductions. Achieving the target of 20 ug/l is also expected to reduce algal abundance (resulting in a shift from dominance of blue-green algae to diatoms and green algae) to levels consistent with Mashapaug Pond's designated uses. *Id*. at 38.

34. The total existing phosphorus load (231.60 kg/yr) must be reduced by 53.5 percent to achieve the TMDL (107.70 kg/yr). Because loads associated with groundwater and atmospheric deposition cannot be easily reduced, a higher percentage of the load reduction must come from the remaining sources. Therefore, a nutrient load reduction of 62 percent from all storm drains and direct overland runoff areas as well as the base flow from

[13] A three-dimensional hydrodynamic and water quality model (EFDC) was configured and applied to Mashapaug Pond by Tetra Tech Inc. to develop this TMDL. The model included 54 horizontal grid cells and 5 vertical layers, to allow simulation of the seasonal stratification of the pond. Annual loads were simulated based on precipitation records and literature derived concentrations. Mashapaug Pond TMDL at viii.

Spectacle Pond is required in order to meet the WQS for hypoxia. A margin of safety (MOS) of slightly more than 5 percent was added to the TMDL. The MOS requires an additional 3 percent load reduction from controllable TP sources, which comprise 190.6 kg/yr of the existing load. *Id*. at 41.

35. The TMDL is a 53.5 percent reduction in the total loading of phosphorus to Mashapaug Pond. The reduction to meet the TMDL will be accomplished by a 62 percent reduction in stormwater point source loads. To ensure that the TMDL target is met, a 3 percent explicit margin of safety is added to the point source load reduction, or slightly more than 5 percent of the TMDL. *Id*. at 40-41.

36. Load reduction simulations (using the calibrated model) indicate that a 65 percent reduction in nutrient loads from the manageable sources (i.e., storm drains, direct overland runoff, and base flow from Spectacle Pond) is necessary to meet the TMDL goals. *Id.* at viii, 41, 55.

37. The TMDL proposes a phased implementation. It calls for a combination of Best Management Practices ("BMPs") to be applied within the watershed. As BMPs are applied and implemented, the response of the phosphorus concentrations within the pond will be measured and BMP adjustments made. Letter, U.S. Envtl. Prot. Agency, Response to Petition for Designation at 10 (Mar. 11, 2014), https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/RDALetterResponse.pdf.

38. Similar efforts, as well as in-lake management techniques, are needed within the Spectacle Pond watershed in Cranston to control the release of phosphorus from sediments and to reduce the phosphorus load from Spectacle Pond into Mashapaug Pond. Mashapaug Pond TMDL at viii.

39. A review of monitoring results and modeling predictions indicates that the Spectacle Pond tributary, which includes runoff from Route 10, contributes the largest single load of phosphorus and fecal coliform to Mashapaug Pond. *Id*. at 46-47.

40. Spectacle Pond is located immediately upstream of Mashapaug Pond. R.I. Dep't of Envtl. Mgmt., Total Maximum Daily Loads for Phosphorus To Address 9 Eutrophic Ponds in Rhode Island (2007),

http://www.dem.ri.gov/programs/benviron/water/quality/rest/pdfs/eutropnd.pdf (the "9 Eutrophic Ponds TMDL"); *see also Conservation Law Foundation v. EPA*, Motion to Dismiss, Ex. 2, Dkt. 17-3 No. 1:15-cv-00165-ML-PAS, 5 (D.R.I. 2016).

41. Spectacle Pond is located within the Pawtuxet River watershed in a highly urbanized area in northern Cranston, near the Providence border. Spectacle Pond is bounded to the north and west by Cranston Street, to the east by Route 10, and to the south by Park Avenue (Route 12). Spectacle Pond is approximately 15.7 hectares (38.8 acres) in area. Spectacle Pond has a maximum depth of approximately 5 meters and an average depth of approximately 2.3 meters. The volume of Spectacle Pond is approximately 3.61×10^5 m^3. Inflow to the pond consists primarily of groundwater, surface water runoff, stormwater runoff, tributary inflow, and direct precipitation. The outflow from Spectacle Pond was previously estimated at 1.05×10^6 m^3/yr (DEM, 2007). The mean hydraulic residence time for the pond is approximately 3 months. 9 Eutrophic Ponds TMDL at 9.

42. There are nineteen identified storm drains and thirteen areas of concentrated surface water flow discharging to Spectacle Pond, its tributary and hydrologically-connected Tongue Pond. *Id.* at 10.

43. Spectacle Pond's outlet is a 48-inch highway culvert under Route 10, located in the northeast portion of the pond. The culvert leads to Mashapaug Brook, which discharges into Mashapaug Pond via an underground conduit. Mashapaug Pond discharges to the Roger Williams Park ponds via underground culverts, which then discharge to the Pawtuxet River, which drains into the Providence River, and ultimately into Narragansett Bay. *Id*. at 10.

44. The Spectacle Pond watershed is highly urbanized and is approximately 238 hectares in area. The watershed is sewered. Commercial and industrial land use make up 17 percent and 10 percent of the watershed, respectively. *Id*. at 9.

45. Spectacle Pond has been monitored by URI Watershed Watch (URIWW) volunteers since 1999. The mean total phosphorus concentration for Spectacle Pond during the URIWW sampling period was 57 ug/l. *Id*. at 24.

46. Spectacle Pond was placed on Rhode Island's 2002 303(d) List of Impaired Waters for excess algae/ chlorophyll a and phosphorus. *Id.* at 47. The major sources of phosphorus to Spectacle Pond, not necessarily in order of significance, are stormwater, waterfowl, and internal cycling. *Id.* at 77.

47. The volume of stormwater generated by the large amounts of impervious areas within the eutrophic pond watersheds suggest that it is the major source of impairments to the eutrophic ponds. *Id.* at 55.

48. Sampling conducted as part of a TMDL for Mashapaug Pond, located only 450 meters down-gradient of the outlet of Spectacle Pond, found that stormwater was a significant source of total phosphorus. *Id*. at 29.

49. The Mashapaug Pond TMDL establishes a target concentration of 42 ug/l for a total load of 38 kg/yr from Spectacle Pond. The 9 Eutrophic Ponds TMDL establishes a target concentration of 20 ug/l for Spectacle Pond, which results in a 28.5 kg/yr estimated total load to Mashapaug Pond—assuming an average annual flow of 1.84 cfs. Mashapaug Pond TMDL at 47.

50. The required phosphorus loading reduction for Spectacle Pond is 68 percent. 9 Eutrophic Ponds TMDL at 52-53.

51. A feasibility study must be conducted to determine the types and locations of BMPs that will be most effective in reducing stormwater volumes and phosphorus loading to the pond to the maximum extent feasible. *Id*. at 77.

52. Reversal of the eutrophication of Mashapaug Pond requires reduction of its phosphorus inputs. Mashapaug Pond TMDL at viii, 45.

53. Significant stormwater is generated in this urban pond's watershed within the City of Providence and from roadways owned by Rhode Island Department of Transportation (DOT). *Id*. at 50.

54. In addition to pollutant reduction, the volume of stormwater that directly discharges into Mashapaug Pond must be reduced. *Id.* at 55.

55. Commercial and industrial property owners must be made aware of their responsibility to institute good housekeeping practices and cognizant of the fact that they contribute to the impairment to Mashapaug Pond. *Id.* at 57.

56. The U.S. Environmental Protection Agency (EPA) approved of Rhode Island's TMDLs for the 9 Eutrophic Ponds and Mashapaug Pond on September 27, 2007. *See* Letter, U.S. Envtl. Prot. Agency, Approval of 9 Eutrophic Ponds and Mashapaug Pond TMDLs (Sept. 27, 2007), https://ofmpub.epa.gov/waters10/attains_impaired_waters.show_tmdl_document?p_tmdl_doc_blobs_id=67876.

57. EPA has determined that these TMDLs meet the requirements of § 303(d) of the Clean Water Act (CWA), and of EPA's implementing regulations. *Id.*

58. EPA Region 1 has concluded that the loading capacities—having been calculated using a water quality model well-known to EPA, and using observed concentration data and water quality targets consistent with or more stringent than numeric water quality criteria—have been appropriately set at levels necessary to attain and maintain applicable water quality standards. The TMDL (107.7 kg/yr, or 0.295 kg/day) is based on a reasonable approach for establishing the relationship between pollutant loading and water quality. *Id.*

59. Once a TMDL is completed and approved, the waste load allocations (WLAs) in that TMDL form the basis for water quality-based effluent limitations for regulated dischargers. *Id.*; 33 U.S.C. § 1342 (a)(1); 40 C.F.R. § 122.44(d)(1)(vii)(B); *see also Conservation Law Foundation v. U.S. EPA*, Motion to Dismiss, Dkt. 17-1 No. 1:15-cv-00165-ML-PAS, 3 (D.R.I. 2016).

60. The currently unregulated discharges from specific property owners could be potential targets for designation. Letter, U.S. Envtl. Prot. Agency, Response to Petition for Designation at 10 (Mar. 11, 2014), https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/RDALetterResponse.pdf.