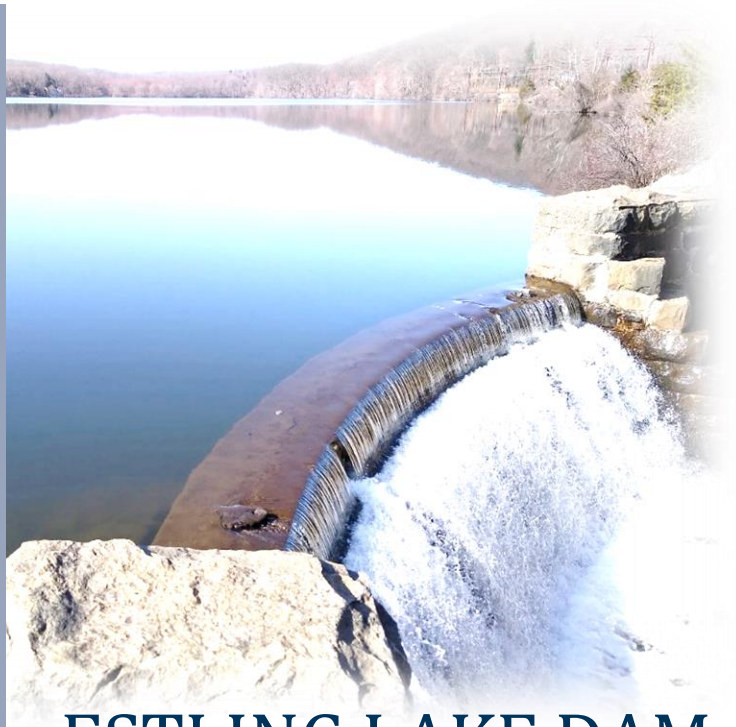

ESTLING LAKE DAM

NJ DEP Dam #25-169

March 31, 2023

NJ Transit & Estling Lake Corporation

2021 Regular Dam Inspection

Prepared By:

Hardesty & Hanover, LLC

303 Fellowship Rd, Ste. 200

Mount Laurel, NJ 08054

TABLE OF CONTENTS

Guide for the Inspection and Preparation of a Report on the Condition of a Dam

New Jersey Dam Safety Inspection Program

State law relating to the construction, repair, modification, and inspection of existing and proposed dams has been in existence since 1912. The law was amended in 1981 and cited as the Safe Dam Act, N.J.S.A. 58:4-1 et seq. The Dam Safety Standards N.J.A.C. 7:20-1 et seq. were promulgated in May 1985 ***and last readopted in June 2008***.

The New Jersey Dam Safety Program is implemented by the Department of Environmental Protection's Engineering and Construction, Division of Dam Safety and Flood Control, Bureau of Dam Safety. The objective of the program is to protect lives and property from the consequences of a dam failure or the improper release of impounded water. A primary means of achieving this goal is through the maintenance and periodic inspection of in-service dams.

The New Jersey Dam Safety inspection program is intended to identify conditions that may adversely affect the safety and functionality of a dam and its appurtenant structures; to note the extent of deterioration as a basis for long term planning, periodic maintenance or immediate repair; to evaluate conformity with current design and construction practices; and to determine the appropriateness of the existing hazard classification. The professional engineer performing the inspection should, where appropriate, recommend subsequent investigations required to resolve uncertain conditions and corrective measures to enable the dam to continue to perform its intended functions. ***For Class I and Class II dams, all addresses, e-mail, and phone numbers contained within the Emergency Action Plan must be verified and current. Inspection reports will be deemed incomplete without this information.***

Inspection Guidelines

The New Jersey Dam Safety inspection guidelines are designed to assist the dam owner with understanding the requirements, responsibilities, and duties inherent with dam ownership and to assist the professional engineer by providing a consistent approach to dam inspection and in-service evaluation.

Several different types of dam inspections can be performed. Dams and appurtenances should be inspected regularly to identify conditions that may adversely affect the safety of a dam and its ability to perform intended functions. An inspection may include the periodic evaluation of the as-built dam to ensure conformity with current design and construction practices.

Dam Classifications

The State of New Jersey recognizes four (4) classes of dams. Class I dams are those structures which, should they fail, would likely cause loss of life. Class II dams are structures which, should they fail, would likely cause substantial downstream property damage but are not considered to be a threat to life. Class III dams are structures which would cause little or no downstream damage should they fail. Class IV dams are structures which are less than 15 feet in height, impound less than 15 acre feet of water to the top of dam, and drain less than 150 acres. No dam may be included in the Class IV category if failure of the dam could cause downstream property damage or loss of life.

When Dams Should be Inspected

Class I and Class II dam owners are required to have a regular inspection performed every two years and

a formal inspection performed every six or ten years respectively. Class III and Class IV dam owners are required to have a regular inspection performed every four years but are not normally required to perform periodic formal inspections. On those years a formal inspection is performed, a regular inspection will not be required. All dams over 70 feet in height or which can potentially store more than 10,000 acre feet of water, regardless of hazard classification, are required to be inspected every year with a formal inspection conducted every third year. All dam inspections shall be performed from March through December.

Types of Inspections

Formal Inspection - The inspection and performance evaluation of Class I and Class II dams under the supervision of a qualified, New Jersey licensed professional engineer to review and determine the safety and integrity of the dam and appurtenant structures. Formal inspections require a detailed field examination and should include a thorough review of the records on project design, construction, and performance. Where appropriate, a reanalysis employing advanced methods and modern design criteria and practices should be conducted in order to determine if the structure meets current design criteria. In addition, formal inspections require that the long-term behavioral patterns revealed by instrumentation and spillway discharges be closely examined. Detailed underwater inspections should be included as needed. A Department approved Emergency Action Plan and Operation and Maintenance Manual should be confirmed and their adequacy determined. ***All addresses, e-mail, and phone numbers contained within the Emergency Action Plan must be verified and current. Inspection reports will be deemed incomplete without this information*** Technical experts and specialists may be required to evaluate individual features and conditions; however, a qualified New Jersey licensed professional engineer must make the final coordinated evaluation. A review of prior regular and formal inspection reports should be undertaken to evaluate trends in performance.

Regular Inspection - The visual inspection of a dam by a qualified, New Jersey licensed professional engineer to detect any signs of deterioration in material, developing weaknesses, or unsafe hydraulic or structural behavior. For Class I and Class II dams, a Department approved Emergency Action Plan should be confirmed and its adequacy determined. ***All addresses, e-mail, and phone numbers contained within the Emergency Action Plan must be verified and current. Inspection reports will be deemed incomplete without this information.*** For all dams, a Department approved Operation and Maintenance Manual should be confirmed and its adequacy determined. All instrumentation data should be reviewed and evaluated.

Informal Inspection - The visual inspection of the dam by the dam owner or operator to detect apparent signs of deterioration or other deficiencies related to the dam structure or its functionality. Informal inspections require that personnel conducting the inspection be knowledgeable about the dam and its appurtenances.

Emergency Inspection - An emergency inspection is an unscheduled inspection of a dam and its appurtenances necessitated by a potentially adverse natural event such as a large flood, earthquake, landslide or when a condition develops that appears to immediately threaten the safety of the dam. An emergency inspection is applicable to any hazard classification and requires immediate attention. Any required emergency repairs resulting from the emergency inspection should be conducted in compliance with N.J.A.C. 7:20 - 1.4 (i).

Inspection Reports and Qualifications of Inspection Personnel

Formal and regular dam inspections must be performed by a qualified, licensed professional engineer. The term "qualified engineer," as used in these standard guidelines is intended to mean an individual who:

1. Is a licensed New Jersey professional engineer.

2. Is competent in items related to dam investigation, design, construction, and operation for the type of dam being inspected.

3. Has at least 10 years of relevant experience in dam investigation, design, construction, operation, and evaluation.

4. Understands the effects of adverse dam incidents and failures and the potential cause of failures.

The text of the report on the condition of a dam should be concise and provide all relevant dam and dam related facts, findings, conclusions, analysis, recommendations, and data. ***For Class I and Class II dams, all addresses, e-mail, and phone numbers contained within the Emergency Action Plan must be verified and current. Inspection reports will be deemed incomplete without this information***. In addition, each report should contain clear, color photographs with each photograph indicating the date it was taken, the State dam reference number, and the photograph location. The visual inspection checklist provided by the Department should be completed and accompany all inspection reports. At the discretion of the Department, a completed visual inspection checklist, together with relevant color photographs and a completed NJ Dam Safety Compliance Schedule Form, will be considered the minimum information required for an acceptable inspection report.

Inspection reports for Class I, Class II and Class III dams should be submitted to the Department within 30 days of the completion of the inspection. Reports for Class IV dams are to be submitted to the county and/or municipality that has jurisdiction over the dam structure.

Informal inspections may be performed by the dam owner or operator and the resulting inspection report shall be part of the owner or operator's permanent file. Unless specifically requested, informal inspection reports are not to be submitted to the Department. The Department may require the owner or operator of any dam to perform an inspection of any type at any time.

SUMMARY

Estling Lake Dam is a jointly owned, man-made impoundment in the municipality of Denville Township, Morris County New Jersey on the Den Brook, and tributary to the Rockaway River. The dam's configuration satisfies the State's definition of a Class I dam being that its failure would likely cause loss of life or extensive property damage.

The dam embankment is owned and maintained by the NJ Transit Corporation and is comprised of a 1,200-ft long and 19-ft high earthen and railroad ballast embankment. Two active electrified commuter rail tracks cross the embankment. The dam spillway and outlet works are owned by the Estling Lake Corporation (ELC), a formal business entity formed to manage the residential and recreational property owners around the lake. The spillway is a semicircular stepped arch weir, 14-ft high and 57-ft wide, comprised of stone, concrete and block. Two manually operated valves penetrate the spillway. One of the valves has not recently been operated and no documentation has been found that documents its operation. One valve has been operated during recent dam inspections and general dam maintenance by ELC.

Hardesty & Hanover was retained to perform a regular dam inspection to fulfill the 2021 regular inspection cycle listed in the Dam's O&M Manual, in order to fulfil the requirements of the New Jersey Safe Dam Act. The inspection was performed on March 30th, 2023 and is visual, non-destructive in nature. No significant issues were discovered that require immediate attention. Previous reports were reviewed to prepare for the inspection and to assess the changes in condition over the years of operation. The inspection team discussed the recent maintenance and repair history with the ELC and NJ Transit. The EAP information was reviewed and updated. The O&M Manual was reviewed and updated. Various personnel and contact information was updated in each document.

We recommend addressing the animal borrow found in the downstream embankment. See photo location exhibit Downstream Embankment section in checklist. Continue to execute the Vegetation Management Plan to remove undesirable growth on the embankment. Previous short-term recommendations have been addressed. Dam studies are ongoing and vegetation management plan is being executed. Significant heavy vegetation has been removed from portions of the downstream and upstream embankment. Long term studies (Hydrology & Hydraulics, Embankment Stability Analysis) have been performed and submitted to NJDEP. Probable Maximum Flood analysis is underway and anticipated to be completed in April 2020.

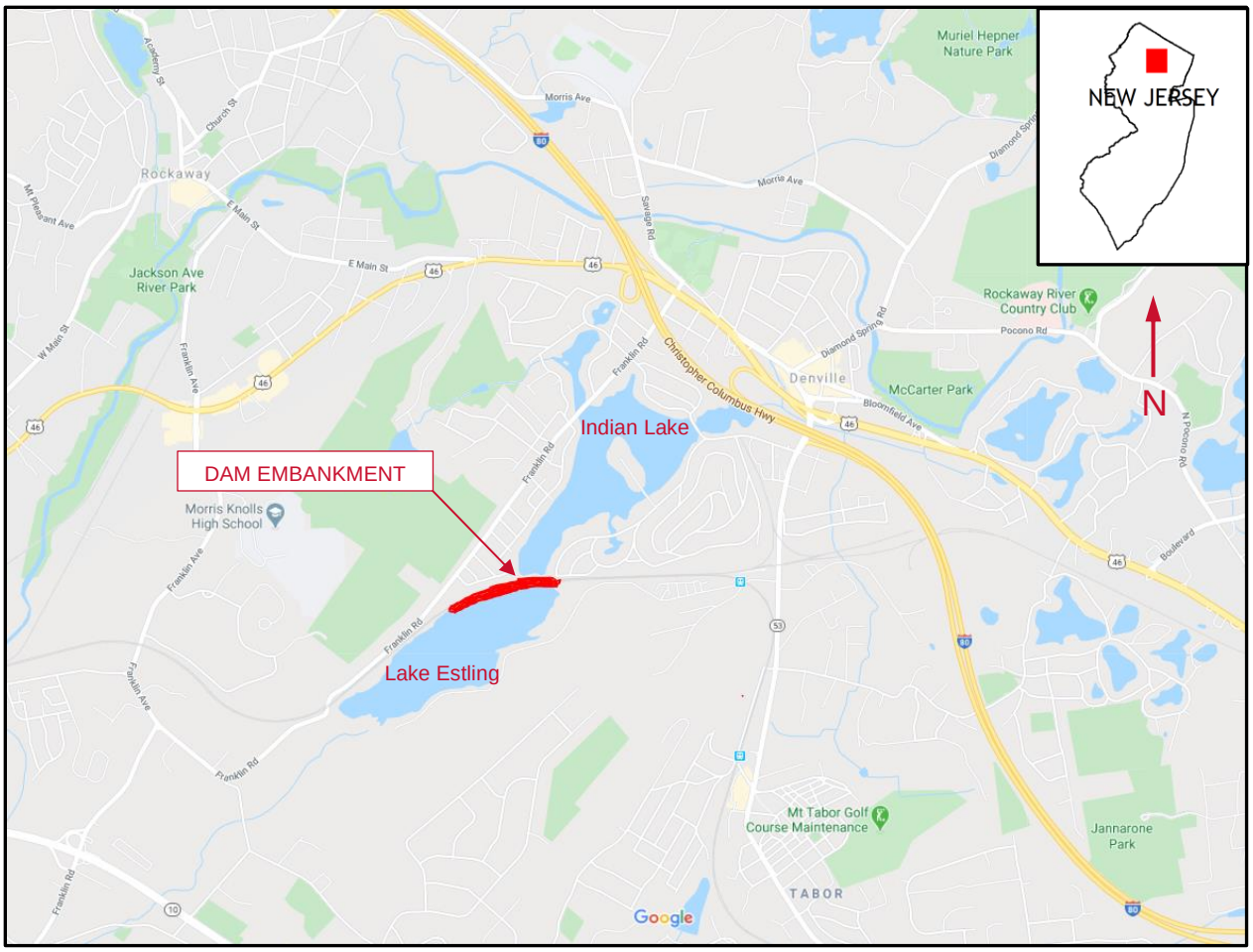

Figure 1 – Estling Lake Dam Location

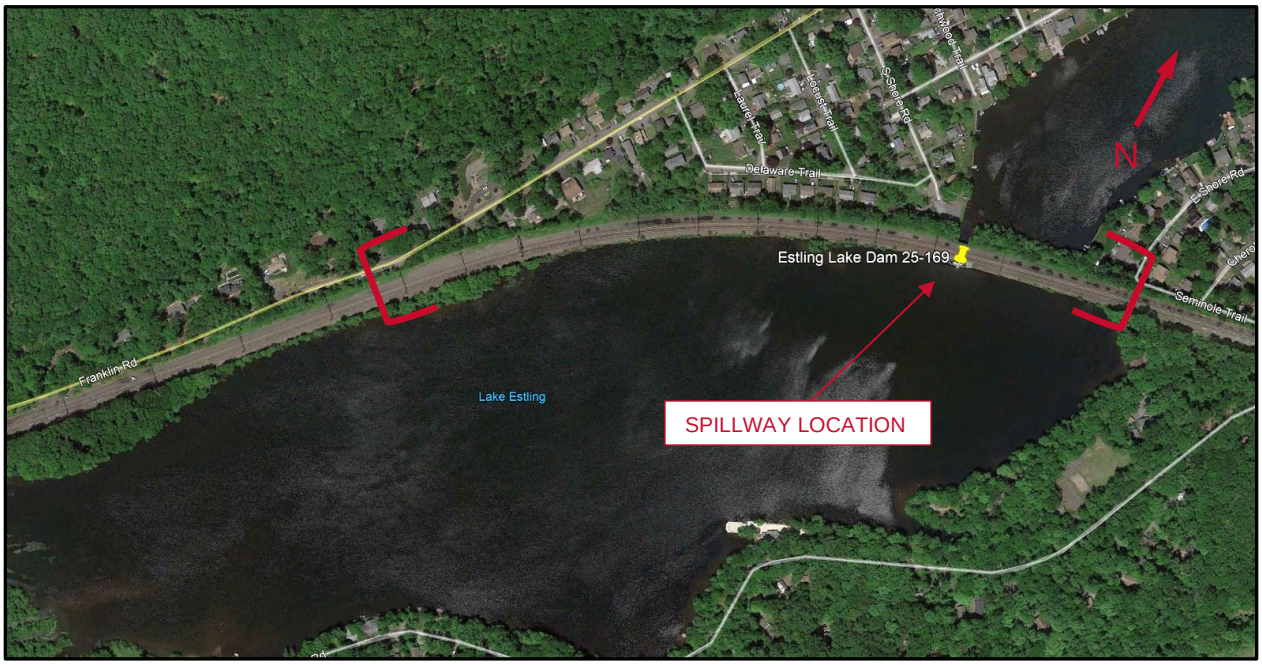

Figure 2 – Estling Lake Limits of Inspection

VISUAL INSPECTION CHECKLIST

This general checklist should be used as an aid when examining all dams. This checklist may not, however, include all features or conditions found at a specific dam that are relevant to the safety of that dam. All features integral to the safety of the dam being examined should be inspected and their condition reported.

NJ INSPECTION YEAR: 2021

TYPE OF INSPECTION: REGULAR

DAM NAME: Estling Lake Dam

DAM FILE NO.: 25-169

LOCATION: NJ Transit Railroad, Morristown Line, M.P. 34.58, Denville Township, Morris County, NJ

OWNER: NJ Transit (Railroad Embankment and Bridge)
Estling Lake Corporation (Principal Spillway and Low Level Outlet)

OPERATOR: Estling Lake Corporation

DATE OF INSPECTION: March 30, 2023

RESERVOIR INFORMATION

Normal Reservoir Elevation (ft): **513.9 NAVD88**

Reservoir Elevation at time of inspection (ft): **514.0 NAVD88**

WEATHER CONDITIONS (including recent rainfall): **Sunny, 31-48^0 F, 0" in 24-Hr, 0.5" in 48-Hrs**

INSPECTION PERSONNEL

New Jersey Licensed Professional Engineer(s):

Name **Joseph Lee Adams, PE** Affiliation **Hardesty & Hardesty LLC**
303 Fellowship Road, Ste 200
Mount Laurel, NJ 08054

Area of Expertise **Hydrology, Hydraulics, Dam Safety**

Non-Licensed technical expert(s) and advisor(s):

Name **Hui Zhang** Affiliation **LS Engineering Associates Cooperation**
150 River Rd, Suite E2, Montville, NJ 07045

Area of Expertise: **NBIS Bridge Inspection**

State Representative(s): **None**

Dam Owner Representative(s):

Name **George Nickels, PE** Affiliation **NJ Transit**

Name **Michael DeAngelis** Affiliation **Estling Lake Corporation**

Others: **None**

GENERAL INFORMATION

Name of Dam: **Estling Lake Dam**

Fed. I.D. No. **00184** N.J. Dam No.: **25-169**

River Basin: **Rockaway River**

Town: **Denville Township** County: **Morris**

Block: **30001** Lot: **1**

Nearest Downstream City-Town: **Boonton**

Stream Name: **Den Brook** Tributary of: **Rockaway River**

Latitude (N): **40˚ 53'** Longitude (W): **74˚ 30'**

Type of Dam: **Earth Embankment**

Purpose of Dam: **Railroad Embankment and Recreational Lake**

Hazard Category: **Class I** Drainage Area: **6.5 Square Miles**

Height: **19 Feet** Length: **1,200 Feet**

Normal Surface: **75 Acres** Normal Capacity: **200 AC-FT**

Maximum Capacity: **1,100 AC-FT** Spillway Capacity: **5,700 CFS at Top of Dam**

HISTORY

Date Constructed: **Railroad Embankment 1860, Bridge 1870, Spillway 1892**

Dates(s) Reconstructed: **1900s**

Designer: **Unknown**

Constructed By: **Embankment – Delaware, Lackawanna & Western Railroad**
Spillway – Unknown

Owner & Address: **Embankment and Bridge – NJ Transit, One Penn Plaza East, Newark, NJ 07105-2246**
Spillway – Estling Lake Corporation, P.O. Box 281, Denville, NJ 07834-0281

Owner/Operator present during inspection (Yes or No): **No**

PREVIOUS INSPECTIONS (date of)

Last Inspection: **March 26, 2020** Last Regular Inspection: **March 26, 2020**

Phase I Inspection: **May 16, 1979** Last Formal Inspection: **November 18, 2017**

EMERGENCY ACTION PLAN (Required for all Class I and Class II dams)

Date of Approved Plan: **September 2013**

Date of Plan Revision: **November 2016, March 2018, March 2020**

Is the notification flowchart complete and current? **Yes**
Is inundation mapping or a description included? **Yes**

Are emergency materials and equipment identified? **Yes**

When was the plan last tested? **Unknown**

DOWNSTREAM HAZARD CLASSIFICATIONS

Present Hazard Classification: **Class I**

Changes in Downstream Land Use and Habitation: **None**

Is present classification appropriate? **Yes**

OPERATION AND MAINTENANCE

Date of Operation and Maintenance Plan: **June 2011, Updated March 2018 and March 2020**

Are instructions adequate? **Yes**

Do operating personnel follow instructions? **Maintenance along crest and inspection of bridge performed by NJ Transit on a regular basis. Some clearing of embankment slopes has been performed. Operation of low-level outlet performed by Estling Lake Corporation, typically one to two times per year.**

What are operating personnel capabilities? **NJ Transit ROW Maintenance Crews familiar with embankment and tracks. Estling Lake Corporation maintenance person familiar with low-level outlet operation.**

EXAMINATION OF EMBANKMENT DAMS AND DIKES

DESCRIPTION OF STRUCTURE

Embankment Material: **Earth**

Cutoff Type: **Unknown**

Impervious Core: **Unknown**

Internal Drainage System: **None Observed**

Movement (Horizontal and Vertical Alignment): **None Observed**

Junctions with Abutments or Embankments: **Good**

Miscellaneous: **Dam serves as embankment for NJ Transit Morristown Line tracks**

CREST

Vertical Alignment: **Good, appears very level and flat**

Horizontal Alignment: **Good, large radius arc. See Photos 15 & 16**

Surface Cracks: **None Observed**

Settlement: **There are regular dips (~ every 40 to 60 ft) in the surface allowing ponding to occur (See Photo 15). This condition exists along the empty site of the rail embankment well beyond the limits of the dam embankment and throughout the railway corridor.**

Unusual Conditions: **NJ Transit Morristown Line Tracks, Catenary, and Signaling Equipment.**

UPSTREAM SLOPE

Slope (Estimate) (H:V): **Approximately 1.5:1 to 2:1**

Trees, Undesirable Growth or Debris, Animal Burrows: **Small Trees, Underbrush, throughout the full length of the upstream slope (See Photos 1 & 2). No animal burrows noted.**

Sloughing, Subsidence or Depressions: **None observed**

Slope Protection: **Railroad Ballast Stone full length of dam. A 2'-3' wide band of 18" - 24" riprap in place at or below the waterline for full length of dam. A combination of 6"-12" riprap and 2.5'-3' boulders are in place along both sides of the weir. (See Photo 4).**

Surface Cracks or Movement at Toe: **None observed**

Unusual Conditions: **Shoreline is difficult to inspect from the embankment due to steep ballast and boulder covered slope and proximity to active railway. See recommended short-term repairs.**

DOWNSTREAM SLOPE

Slope (Estimate) (H:V): **Approximately 1.5:1 to 2:1**

Trees, Undesirable Growth or Debris, Animal Burrows: **Large Trees and Underbrush (See Photos 11-14, 17, 19).**

Sloughing, Subsidence or Depressions: **Each trail entry leads to erosion and an irregular slope (See Photos 9, 10 & 17). Did not notice previously noted slope undulation near the spillway. Some evidence of locally over-steepened slopes experiencing sloughing of topsoil mat (See Photo 19). One animal burrow found (See Photo 11).**

Surface Cracks or Movement at Toe: **None observed. Vegetation was thick along embankment and visibility of the toe was obstructed in many areas.**

Seepage: **Standing water near toe (See Photo 20).**

External Drainage System (Ditches, Trenches, Blanket): **Shallow drainage ditch along toe west of bridge (See Photo 18). Culvert (18-in RCP) at confluence with spillway tailwater.**

Condition Around Outlet Structure: **Minor erosion at exterior of bridge wingwalls, primarily from foot traffic.**

Unusual Conditions: **Footpath worn into downstream face west of bridge (See Photo 9).**
One animal burrow located. Small burrow found to the west of the outlet (See Photo 11).

ABUTMENTS AND TOE AREA (See discussion in Examination of Spillways and Outlet Works)

Erosion at Contract: **N/A**

Seepage or Wet Area Along Contract: **N/A**

Signs of Movement: **N/A**

Depressions, Sinkholes: **N/A**

Unusual Conditions: **N/A**

SEEPAGE AND TOE DRAIN / RELIEF WELL FLOW SUMMATION

Location	Estimated Flow	Color (Turbidity)
N/A	**N/A**	**N/A**

None observed

EXAMINATION OF CONCRETE AND MASONRY DAMS

DESCRIPTION OF STRUCTURE

Type of Dam (Gravity, Arch, etc.): **None**

Internal Drainage System: **N/A**

Movement (Horizontal and Vertical Alignment): **N/A**

Miscellaneous: **N/A**

UPSTREAM FACE

Condition of Concrete or Masonry: **N/A**

Cracking: **N/A**

Location	Orientation	Length	Width	Type
N/A	**N/A**	**N/A**	**N/A**	**N/A**

DOWNSTREAM FACE

Condition of Concrete or Masonry: **N/A**

Cracking: **N/A**

Location	Orientation	Length	Width	Type
N/A	**N/A**	**N/A**	**N/A**	**N/A**

Leakage Through Dam (Location and Estimated Flow): **N/A**

CREST

Condition of Concrete or Masonry: **N/A**

Cracking: **N/A**

Location	Orientation	Length	Width	Type
N/A	**N/A**	**N/A**	**N/A**	**N/A**

Signs of Movement: **N/A**

Differential Movement (Joint or Crack Separation or Offset): **N/A**

GALLERIES

Cracking: **N/A**

Location	Orientation	Length	Width	Type
N/A	**N/A**	**N/A**	**N/A**	**N/A**

Differential Movement (Joint or Crack Separation): **N/A**

Leakage into Galleries (Location and Estimated Flow): **N/A**

Condition of Gallery Drains: **N/A**

FOUNDATION

Condition of Rock or Concrete Lining: **N/A**

Cracking: **N/A**

Signs of Movement: **N/A**

Seepage (Location and Estimated Flow): **N/A**

ABUTMENTS AND TOE AREA

Seepage or Wet Areas: **N/A**

Signs of Movement: **N/A**

Cracking: **N/A**

Erosion: **N/A**

Unusual Conditions: **N/A**

(Attach additional sheets for facilities with more than one concrete or masonry dam or dike)

EXAMINATION OF SPILLWAYS AND OUTLET WORKS

TYPE(S) AND DESCRIPTION OF SPILLWAY(S)

Primary: **Stone Masonry**

Secondary (auxiliary): **None**

Emergency: **None**

Other: **NJ Transit Railroad Embankment**

FOR EACH SPILLWAY THE FOLLOWING ASPECTS MUST BE EXAMINED WHERE APPROPRIATE

ENTRANCE CHANNEL

Description: **No Channel – Estling Lake**

Vegetation (Trees, Bushes): **None**

Debris: **None**

Channel Side-Slope Stability: **N/A**

Slope Protection/Erosion: **N/A**

Unusual Conditions: **N/A**

SPILLWAY CREST

Description: **Arched Stone Masonry (See Photos 3 & 4)**

Condition of Material: **Fair**

Signs of Movement: **None Observed**

Joints: **Fair**

Unusual Conditions: **None noted. Significant flow over primary spillway does not permit close inspection.**

DROP BOX

Description: **None**

Condition of Material: **N/A**

Signs of Movement: **N/A**

Joints: **N/A**

Floor: **N/A**

Unusual Conditions: **N/A**

SPILLWAY WINGWALLS

Description: **Arched Stone Masonry**

Condition of Material: **Fair**

Signs of Movement: **None observed**

Joints: S**ome visible seepage observed (See Photos 6 & 7)**.

Drains: **None observed**

Unusual Conditions: **Reinforced concrete bridge and wingwalls constructed over masonry spillway wingwalls when concrete bridge added to masonry bridge (See Photo 8).**

DOWNSTREAM APRON

Description: **Concrete Floor Slab**

Condition of Material: **Good**

Signs of Movement: **None observed**

Unusual Conditions: **Previous inspections noted the following, but due to high flow conditions, could not be confirmed: The downstream end of the apron is exposed up to 6" high, with no observed undermining, and ~3" diameter stone/riprap and mixed organics in place along the channel bottom.**

CULVERTS

Description: **Upstream – Reinforced Concrete (See Photo 5); Downstream – Stone Masonry Arch with Stucco Face (See Photo 8).**

Condition of Material:
Upstream – Spalling, cracking, and efflorescence is present on upstream bridge face and parapet with exposed reinforcement (See Photo 5). Efflorescence, minor staining and scaling is visible to the interior faces. Minor seepage on interior faces.

Downstream – Previous inspections noted the following: Mortar loss to stone masonry below water line. Minor seepage at masonry joints exposed above the water.

Joints: **Fair. Significant loss of stucco on portions of bridge arch interior.**

Signs of Movement: **None observed**

Seepage: **None of significance noted.**

Location	Estimated Flow	Turbidity
Various (See Photo 4)	**approx. 1 gpm each wingwall**	**Appear clear**

Unusual Conditions: **Concrete bridge is showing additional spalling, deterioration, and exposed reinforcement compared to previous inspections. See December 7, 2020 NJ Transit Bridge Inspection Report in Appendix A for more information on bridge conditions. (See Photos 6-9).**

TRASH RACKS

Description: **None**

Condition of Material: **N/A**

Unusual Conditions: **N/A**

CHUTES

Description: **None**

Condition of Material: **N/A**

Signs of Movement: **N/A**

Unusual Conditions: **N/A**

STILLING BASIN

Description: **None**

Condition of Material: **N/A**

Signs of Movement: **N/A**

Erosion: **N/A**

Unusual Conditions: **N/A**

EXIT CHANNEL None – Indian Lake downstream of bridge

Vegetation (Trees, Bushes): **On right shoreline looking downstream**

Debris: **None Observed**

Channel Side-Slope Stability: **Good**

Erosion: **None Observed**

Unusual Conditions: **None Observed**

LOW LEVEL OUTLET

Description: **The dam has two low-level outlets with valves, one at each Masonry Spillway Wingwall. Each valve controls a 24" diameter cast iron drain line that extends into Estling Lake. The drains are intended to lower the lake for both maintenance and emergency purposes. West low-level outlet is not operable, the inlet pipe is buried, and has been abandoned. East low-level outlet is operable, and the inlet pipe extension into the Lake was replaced in 2015.**

Condition: **The east valve inlet pipe and trash rack were recently upgraded. The west valve is inoperable and abandoned.**

Trash Rack: **The east valve inlet trash rack was replaced on 8/25/18. The west valve is abandoned.**

Leakage: **Not inspectable during a Regular Inspection**

Location	Estimated Flow
See Above	

Unusual Conditions: **None Observed**

Was the low-level outlet operated during the inspection? **No.**

Were there difficulties operating the low-level outlet? **None reported**

When was the low-level outlet last operated and did this conform with the Operation and Maintenance procedures? **The valve was opened by Estling Lake Corporation on September 16, 2019 and closed on September 24, 2019 after completing crack repairs. Yes.**

Miscellaneous: **None**

STILLING BASIN FOR LOW LEVEL OUTLET

Description: **Same Structure as Spillway Apron (See Above)**

Condition of Material: **Good**

Signs of Movement: **None Observed**

Erosion: **None Observed**
Unusual Conditions: **None Observed**

EXIT CHANNEL FOR LOW LEVEL OUTLET

Description (Trees, Bushes): **None**

Debris: **N/A**

Channel Side-Slope Stability: **N/A**

Slope Protection Erosion: **N/A**

Unusual Conditions: **N/A**

EXAMINATION OF OTHER FEATURES

INSTRUMENTATION (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)
Location, condition: **None**

(A separate report including instrument readings, condition of instruments, observations, and conclusions based upon the collected data should be attached.)

RESERVOIR

Slopes: **Stable**

Sedimentation: **Could Not Observe**

Unusual Conditions Which Affect Dam: **The masonry spillway appears to have been constructed to create the lake after the original railroad embankment and masonry bridge was constructed. Therefore, the embankment was not originally intended to function as a dam. The concrete bridge was added after the masonry bridge and the concrete bridge wingwalls appear to have been constructed over spillway wingwalls.**

Unusual Conditions: **No Others Observed**

APPURTENANT STRUCTURES (Power House, Gatehouse, Penstocks, Water Supply, Other) Description and Condition of each: **None**

CONCLUSION

DAM INSPECTION PROGRAM GUIDELINES

The following new guidelines have been established by the NJDEP Division of Dam Safety & Flood Control to help meet the requirements of the National Inventory of Dams condition assessment of existing dam structures. Please follow the guidelines/definitions below and select the appropriate checkbox.

SATISFACTORY
No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria. Minor maintenance items may be required.

FAIR
Acceptable performance is expected under all required loading conditions (static, hydrologic, seismic) in accordance with the applicable dam safety regulatory criteria. Minor deficiencies may exist that require remedial action and/or secondary studies or investigations.

POOR
A dam safety deficiency is recognized for any required loading condition (static, hydrologic, seismic) in accordance with the applicable dam safety regulatory criteria. Remedial action is necessary**. POOR also applies when further critical studies or investigations are needed to identify any potential dam safety deficiencies.**

UNSATISFACTORY
Considered unsafe. A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Reservoir restrictions may be necessary.

I certify that the dam structure referenced herein was personally inspected by me and was found to be in the following condition **(select one only):**

- ☐ SATISFACTORY
- ☐ FAIR
- ☑ POOR
- ☐ UNSATISFACTORY

CONCLUSION (continued)

I recommend the following repairs be made immediately:
Fill the animal burrow on the downstream slope.

The following long term improvements should also be undertaken:
Address bridge repairs as required by the NBIS inspection. Continue execution of previous studies and recommendations, already underway, i.e. vegetation removal and control.

The following studies are recommended:	☐ Hydrologic and Hydraulic analysis ☐ Stability analysis ☐ Failure/Inundation analysis ☐ Other _PMF Analysis & Overtopping Design_ ☐ None

Have the recommendations above included those from the Phase I Inspection Report or previous Regular or Formal Inspection Reports? If not, indicate why. **YES –**

H&H Analysis 1/4/2019
Stability Analysis 2/28/2020
PFMA Analysis October 7, 2020. Complete
Design for Overtopping anticipated December 2023

EMERGENCY ACTION PLAN (**This section must be completed for all Class I & II dams)**

Date of Approved Plan: **September 2013**

Date of Last Plan Revision: **November 2015, February 2018, March 2020**

Is the notification flowchart complete and current? (If the notification flow chart is not complete and current, all modifications, corrections, and additions must be made and replacement pages submitted with this report) **Yes (Cover, 4, 5, 11, 14, 15, 19)**

Is inundation mapping or a description included? **Yes** If not, why? **N/A**

NJ Dam Safety Compliance Schedule Form (attached). This form must be completed or the Inspection Report will be deemed incomplete.

Name of Professional Engineering Company / Consultant Representing the Owner:
Hardesty & Hanover, LLC

Company/Consultant Address: **303 Fellowship Road, Suite 200**
Mount Laurel, New Jersey 08054

Company/Consultant Telephone Number: **856-437-6370**

New Jersey Licensed Professional Engineer representing the dam owner in responsible charge of the inspection: **Joseph Lee Adams, PE**

Sign _____ Date 5 May 2023

New Jersey Professional Engineer License Number: **GE44139**

New Jersey Dam Safety Compliance Schedule Form

Dam Name:	**Owner:** New Jersey Transit	**Owner's Engineering Firm:**
Estling Lake Dam Embankment and Bridge	**Address:** One Penn Plaza East	**Name:** Hardesty & Hanover, LLC
File No:	**Address:** Newark, New Jersey	**Address:** 303 Fellowship Road
25-169	**Address:** 07105-2246	**Address:** Suite 200
	Phone: 973-491-8086	**Address:** Mount Laurel, NJ 08054
	Email: GNickels@njtransit.com	**Phone:** 856-437-6370

The purpose of this form is to allow the dam owner, through consultation with their engineer, to establish a time line for addressing the deficiencies identified in the inspection report for the dam and bringing the dam into compliance with the New Jersey Dam Safety Standards, N.J.A.C. 7:20-1.1 et seq.

Proposed time frame for submission of required information and implementation of recommended repairs:
(Engineer should check required sections and propose appropriate time frames. However, the Bureau of Dam Safety reserves the right to require additional dates and/or information as needed.)

☒ **Performance of maintenance and repairs not requiring approval from the Bureau of Dam Safety** (Such work includes grass mowing, brush removal, debris removal, filling of animal burrows, minor concrete repairs, minor gate repairs, filling of areas of minor surface erosion, etc. The Bureau of Dam Safety must be notified upon completion of these activities.)

Work to be completed no later than: December 31, 2023

☐ **Engineering Report / Studies** (This work includes any required hydrologic and hydraulic analysis, structural analysis, alternative analysis, geotechnical investigations or dam breach analysis that may be recommended by your engineer and/or required by the Bureau of Dam Safety.)

Studies to be submitted for review no later than: _____

☒ **Permit Application:** (A permit application must be submitted for any construction activity at the dam. The permit application must address all deficiencies as identified in the inspection report and the subsequent engineering report / studies.)

Permit application to be submitted no later than Dec 2024 months after the date of the Bureau of Dam Safety's approval of any required studies. (Please provide date if no studies are required.)

☒ **Construction to start no later than Dec 2025 months after the date of issuance of the permit by the Bureau of Dam Safety.**

☐ **Operation and Maintenance Plan (O&M):** (An O&M is required for all dams. O&M's should be submitted with the permit application or sooner if possible. Existing O&M's may need to be updated if a dam is being rehabilitated. Please indicate date a new or revised O&M will be submitted if there is not an existing and approved Manual on file with this office.)

O&M to be submitted no later than: Complete

☐ **Emergency Action Plan (EAP):** (EAPs are required for all high and significant hazard dams and should be submitted as soon as possible. Existing EAPs should be reviewed on a yearly basis and revised as necessary. Please indicate date a new or updated EAP will be submitted if there is not an existing and approved Plan on file with this office.)

EAP to be submitted no later than: Complete

The dates provided above will be reviewed by the Bureau of Dam Safety to determine if the schedule is acceptable to achieve compliance with the Dam Safety Standards. Requests for extensions to the accepted time frames outlined above must be submitted to this office in writing along with appropriate justification and will be considered on its merits on a case by case basis.

Signed: Dam Owner	**Date**	**Signed: Owner's Engineer**	**Date**
	5/15/2023		5 May 2023

Additional information including the Bureau of Dam Safety forms, standards and inspection guidelines as well and EAP guidelines and a sample O&M is available at http://www.nj.gov/dep/damsafety/ or contact the office via e-mail at Damsafety@dep.nj.gov or telephone at (609) 984-0859. Please submit the completed form to: NJDEP, Bureau of Dam Safety, Mail Code 501-01A, P.O. Box 420, Trenton, NJ 08625.

New Jersey Dam Safety Compliance Schedule Form

Dam Name:	**Owner:** Estling Lake Corporation	**Owner's Engineering Firm:**
Estling Lake Dam Spillway & Low-Level Outlets	**Address:** PO Box 281	**Name:**
File No:	**Address:** Denville, New Jersey	**Address:**
25-169	**Address:** 07834	**Address:**
	Phone: 646-894-0679	**Address:**
	Email: richardpricejr@gmail.com	**Phone:**

The purpose of this form is to allow the dam owner, through consultation with their engineer, to establish a time line for addressing the deficiencies identified in the inspection report for the dam and bringing the dam into compliance with the New Jersey Dam Safety Standards, N.J.A.C. 7:20-1.1 et seq.

Proposed time frame for submission of required information and implementation of recommended repairs:
(Engineer should check required sections and propose appropriate time frames. However, the Bureau of Dam Safety reserves the right to require additional dates and/or information as needed.)

❑ **Performance of maintenance and repairs not requiring approval from the Bureau of Dam Safety** (Such work includes grass mowing, brush removal, debris removal, filling of animal burrows, minor concrete repairs, minor gate repairs, filling of areas of minor surface erosion, etc. The Bureau of Dam Safety must be notified upon completion of these activities.)

Work to be completed no later than: _____

❑ **Engineering Report / Studies** (This work includes any required hydrologic and hydraulic analysis, structural analysis, alternative analysis, geotechnical investigations or dam breach analysis that may be recommended by your engineer and/or required by the Bureau of Dam Safety.)

Studies to be submitted for review no later than: _____

❑ **Permit Application:** (A permit application must be submitted for any construction activity at the dam. The permit application must address all deficiencies as identified in the inspection report and the subsequent engineering report / studies.)

Permit application to be submitted no later than _____ months after the date of the Bureau of Dam Safety's approval of any required studies. (Please provide date if no studies are required.)

❑ **Construction to start no later than _____ months after the date of issuance of the permit by the Bureau of Dam Safety.**

❑ **Operation and Maintenance Plan (O&M):** (An O&M is required for all dams. O&M's should be submitted with the permit application or sooner if possible. Existing O&M's may need to be updated if a dam is being rehabilitated. Please indicate date a new or revised O&M will be submitted if there is not an existing and approved Manual on file with this office.)

O&M to be submitted no later than: _____

❑ **Emergency Action Plan (EAP):** (EAPs are required for all high and significant hazard dams and should be submitted as soon as possible. Existing EAPs should be reviewed on a yearly basis and revised as necessary. Please indicate date a new or updated EAP will be submitted if there is not an existing and approved Plan on file with this office.)

EAP to be submitted no later than: _____

The dates provided above will be reviewed by the Bureau of Dam Safety to determine if the schedule is acceptable to achieve compliance with the Dam Safety Standards. Requests for extensions to the accepted time frames outlined above must be submitted to this office in writing along with appropriate justification and will be considered on its merits on a case by case basis.

Signed: Dam Owner **Date** **Signed: Owner's Engineer** **Date**

Additional information including the Bureau of Dam Safety forms, standards and inspection guidelines as well and EAP guidelines and a sample O&M is available at http://www.nj.gov/dep/damsafety/ or contact the office via e-mail at Damsafety@dep.nj.gov or telephone at (609) 984-0859. Please submit the completed form to: NJDEP, Bureau of Dam Safety, Mail Code 501-01A, P.O. Box 420, Trenton, NJ 08625.

PHOTOS

REGULAR INSPECTION
PHOTO LOCATION KEY
DAM 25-169

PHOTO 1: View of Estling Lake Dam reservoir looking northeast.

PHOTO 2: View of Estling Lake Dam reservoir looking southwest.

PHOTO 3: Junction of west spillway wingwall with concrete bridge and wingwall looking southwest.

PHOTO 4: Upstream face of Dam including face of concrete bridge looking southeast.

PHOTO 5: Close up of upstream bridge deterioration with spalls and exposed reinforcement looking northwest.

PHOTO 6: Joint deterioration and seepage at eastern spillway wingwall looking northeast.

PHOTO 7: Joint deterioration and seepage at western spillway wingwall looking west.

PHOTO 8: Downstream face of masonry bridge looking southwest.

PHOTO 9: Eroded footpath along masonry bridge at northwest embankment looking south.

PHOTO 10: Minor surface erosion along footpath looking south.

PHOTO 11: Small animal burrow on downstream embankment, approximately 3” looking southeast.

PHOTO 12: Downstream embankment with full-grown trees looking northeast.

PHOTO 13: Previous area of clearing with excessive vegetation growth along downstream embankment looking southwest.

PHOTO 14: Previous area of clearing with excessive vegetation growth along downstream embankment looking northeast.

PHOTO 15: Concave surface on crest of dam looking northeast.

PHOTO 16: Crest of dam looking southwest.

PHOTO 17: Foot trail at end of East Shore Road on downstream side, minor erosion looking southwest.

PHOTO 18: Ponding with meandering stream along dam embankment at downstream looking west.

PHOTO 19: Previous topsoil sloughing covered with vegetation growth at downstream embankment looking south.

PHOTO 20: Boggy, wet area of possible seepage with rust stains at toe looking southwest.