DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Waterways Engineering and Wetlands

DOCUMENT NUMBER: 310-2100-002

TITLE: Guidance for Developing a Chapter 105 Alternatives Analysis

EFFECTIVE DATE: Upon publication of notice as final in the *Pennsylvania Bulletin*

AUTHORITY: This document is established in accordance with Section 1917-A of The Administrative Code of 1929, Act of April 9, 1929, P.L. 177, as amended, 71 P.S. § 510-17; The Clean Streams Law, Act of June 22, 1937, P.L. 1987, as amended, 35 P.S. §§ 691.1-691.1001; Dam Safety and Encroachments Act, Act of November 26, 1978, P.L. 1375, as amended, 32 P.S. §§ 693.1-693.27; Flood Plain Management Act, Act of October 4, 1978, P.L. 851, No. 166, as amended, 32 P.S. §§ 679.101-679.604; Oil and Gas Act of 2012, Act of February 14, 2012, P.L. 87, No. 13, 58 Pa. C.S. §§ 3201-3274; the Pennsylvania Safe Drinking Water Act, Act of May 1, 1984, P.L. 206, as amended, 35 P.S. §§ 721.1-721.17; the Solid Waste Management Act, Act of July 7, 1980, P.L. 380, as amended, 35 P.S. §§ 6018.101-6018.1003; and the regulations promulgated under these statutes, including 25 Pa. Code Chapters 78, 78a, 91, 92a, 93, 95, 96, 102, 105, 106, 109, 287, 288, 289, 293 295, 297, and 299.

POLICY: Provides guidance on the preparation of a Chapter 105 alternatives analysis.

PURPOSE: The purpose of this technical guidance document is to consolidate existing guidance and to expand upon existing guidance by: (1) providing guidelines for applicants to determine the level of information needed when evaluating alternatives for projects requiring a permit or other approval for a dam, water obstruction, or encroachment under 25 Pa. Code Chapter 105; (2) providing guidelines for determining if an alternative should be considered practicable; and (3) establishing a common, complete, and consistent level of understanding of the information needed by the Department of Environmental Protection (DEP or the Department) to adequately review alternatives analyses for structures and activities that may affect regulated that may affect regulated waters of this Commonwealth.

APPLICABILITY: This guidance applies to all proposed projects involving a dam, water obstruction or an encroachment located in, along, across, or projecting into regulated waters of this Commonwealth where an Environmental Assessment in accordance with 25 Pa. Code § 105.15 is required or where a permit, registration, or other approval must document how impacts were avoided and minimized. (25 Pa. Code §§ 105.13, 105.14, 105.15, 105.16, 105.18a)

DISCLAIMER: The policies and procedures outlined in this guidance are intended to supplement existing requirements. Nothing in these policies or procedures shall affect regulatory requirements.

The policies and procedures herein are not an adjudication or a regulation. DEP does not intend to give this guidance that weight or deference. This document establishes the framework within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

PAGE LENGTH: 33 pages

TABLE OF CONTENTS

I. DEFINITIONS

Alternatives Analysis – A detailed analysis of alternatives to the proposed action, including alternative locations, routings, or designs to avoid or minimize adverse environmental impacts. (This definition is adapted from 25 Pa. Code § 105.13(e)(1)(viii).)

Aquatic Resources – Regulated waters of this Commonwealth, which includes watercourses, streams, wetlands, or other bodies of water, and their floodways, as these terms are defined in 25 Pa. Code § 105.1.

Body of Water – A natural or artificial lake, pond, reservoir, swamp, marsh, or wetland. (25 Pa. Code § 105.1)

Environmental Assessment – For the purposes of this document, this term refers to the environmental assessment described in the Chapter 105 regulations, particularly at 25 Pa. Code § 105.15, and in DEP's *Environmental Assessment Form* (3150-PM-BWEW0017).

Impacts –

Direct Impacts – Consist of filling or draining an aquatic resource, or converting an aquatic resource to a nonaquatic (i.e., upland or terrene) environment or converting an aquatic resource from one type to another type, such as converting a palustrine wetland to a lacustrine open body of water. Examples of direct impacts may include: placement of fill in a wetland; placement of fill in the floodplain; placement of a structure (e.g., culvert) or rock in a stream; or building a dam where the impoundment area will flood existing aquatic resources (e.g., stream channel, floodplain, and/or wetlands) with a sufficient depth as to change the existing aquatic resource to another type of aquatic resource. Direct impacts include changes such as converting a riverine system to a lacustrine system (i.e., damming) or changing a palustrine wetland to a lacustrine system. (This definition mirrors the definition of the same term in DEP's *Environmental Assessment Form* (3150-PM-BWEW0017).)

Indirect Impacts – Altering the chemical, physical, or biological characteristics of an aquatic resource to an extent that changes the functions of the resource. Indirect impacts change resource functions, but generally do not result in a loss of resource acreage. Examples of indirect impacts include: the conversion of a forested wetland system to a non-forested state through chemical, mechanical, or hydrologic manipulation that results in a maintained state of vegetation; altered hydrologic conditions (e.g., increases or decreases), such as stormwater discharges or water withdrawals, that alter the chemical, physical, or biological functions of the resource; scouring of a watercourse due to changes in flow velocity; maintenance of areas such as waterway openings (e.g., bedload deposition removal); and rights-of-way through aquatic resources. (This definition mirrors the definition of the same term in DEP's *Environmental Assessment Form* (3150-PM-BWEW0017).)

Permanent Impacts – Aquatic resource areas permanently altered or affected by a dam, water obstruction, or encroachment that may consist of both direct or indirect impacts resulting from the placement or construction of a dam, water obstruction, or encroachment and include areas necessary for the operation and maintenance of the dam,

water obstruction, or encroachment located in, along or across, or projecting into a watercourse, floodway, or body of water. Examples of permanent impacts include bridges, culverts, pipelines, and the areas required for their operation and maintenance. (This definition is adapted from 25 Pa. Code § 105.15 and DEP's *Environmental Assessment Form* (3150-PM-BWEW0017).)

Secondary Impacts – Changes associated with, but not the direct result of, the construction or substantial modification of a dam or reservoir, water obstruction, or encroachment in the area of the project and in areas adjacent thereto. Secondary impacts also include future impacts associated with dams, water obstructions, or encroachments, the construction of which would result in the need for additional dams, water obstructions, or encroachments to fulfill the project purpose. One example of a secondary impact is loss of hydrology to a nearby wetland from construction in the area of the project or in an adjacent area. (This definition is adapted from 25 Pa. Code § 105.14(b)(12) and DEP's *Environmental Assessment Form* (3150-PM-BWEW0017).)

Temporary Impacts – Aquatic resource areas temporarily altered or affected during the construction of a dam, water obstruction, or encroachment that may consist of both direct or indirect impacts located in, along, or across, or projecting into a watercourse, floodway, or body of water that are restored upon completion of construction. Temporary impacts do not include impacts to areas that will be maintained as a result of the operation and maintenance of the dam, water obstruction, or encroachment located in, along, or across, or projecting into a watercourse, floodway, or body of water, which are considered permanent impacts. Examples of temporary impacts include temporary workspaces and temporarily dewatered areas. (This definition is adapted from 25 Pa. Code § 105.15 and DEP's *Environmental Assessment Form* (3150-PM-BWEW0017).)

Mitigation – (i) An action undertaken to accomplish one or more of the following: (A) avoid and minimize impacts by limiting the degree or magnitude of the action and its implementation; (B) rectify the impact by repairing, rehabilitating, or restoring the impacted environment; (C) reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action. (ii) If the impact cannot be eliminated by following clauses (A) - (C), compensate for the impact by replacing the environment impacted by the project or by providing substitute resources or environments. (25 Pa. Code § 105.1)

Rare and Significant Ecological Features – Non-species resources identified on a Pennsylvania Natural Diversity Inventory (PNDI) Receipt. These may include unique geological features, significant natural features, or significant natural communities. See also DEP's *Policy for Pennsylvania Natural Diversity Inventory (PNDI) Coordination During Permit Review and Evaluation* (021-0200-001).

Regulated Waters of this Commonwealth – Watercourses, streams, or bodies of water and their floodways, wholly or partly within or forming part of the boundary of this Commonwealth. (25 Pa. Code § 105.1)

Right-of-Way (ROW) – For highways, pipelines, and utility lines, the boundary line within which the applicant/operator has a legal right to do earthwork and to maintain and operate a highway, pipeline, or utility line following construction. (This definition is adapted from DEP's *Erosion and Sediment Pollution Control Program Manual* (363-2134-008).)

Sensitive Features – Areas or features affected by or nearby a dam, water obstruction, or encroachment that include but are not limited to: regulated waters of this Commonwealth, including wetlands; riparian areas; woodlands; designated habitat of threatened and endangered species; natural flow pathways/drainageways; steep slopes; natural areas; wildlife sanctuaries; public water supplies; other geographical or physical features including cultural, archaeological, and historical landmarks; National wildlife refuges; National natural landmarks; National, State, or local parks or recreation areas; and National, State, or local historical sites. See also Chapter 5.4.1 of DEP's *Pennsylvania Stormwater Best Management Practices Manual* (363-0300-002) and 25 Pa. Code §§ 105.14(b)(4), 105.14(b)(5), 105.13(e)(1)(viii), and 105.16.

Special Concern Species – Plant and animal species that are not listed as threatened or endangered by a jurisdictional agency but are identified on a PNDI Receipt as an at-risk species. These include: (1) plant and animal species that are classified as rare, vulnerable, and tentatively undetermined or candidate; (2) taxa of conservation concern; and (3) special concern plant populations. See also DEP's *Policy for Pennsylvania Natural Diversity Inventory (PNDI) Coordination During Permit Review and Evaluation* (021-0200-001).

Threatened and Endangered Species – Those animal and plant species identified as a threatened or endangered species, as determined under: the Endangered Species Act of 1973, 16 U.S.C.A. §§ 1531 *et seq*.; the Wild Resources Conservation Act, 32 P.S. §§ 5301 *et seq*.; Fish and Boat Code, 30 Pa. C.S.A. §§ 101 *et seq*.; and Game and Wildlife Code, 34 Pa. C.S.A. §§ 101 *et seq*. This also includes animal and plant species proposed for listing as endangered and threatened, pursuant to the Endangered Species Act of 1973. See also DEP's *Policy for Pennsylvania Natural Diversity Inventory (PNDI) Coordination During Permit Review and Evaluation* (021-0200-001).

Water Dependency – The circumstance which requires a dam, water obstruction, or encroachment to have access or proximity to, or siting within, aquatic resources to fulfill the basic purposes of the project. (This definition is adapted from 25 Pa. Code §§ 105.13(e)(1)(iii)(D) and 105.13(e)(1)(x)(C).) Additional criteria concerning a determination of water dependency are contained in 25 Pa. Code § 105.14(b)(7).

Watercourse – A channel or conveyance of surface water having defined bed and banks, whether natural or artificial, with perennial or intermittent flow. (25 Pa. Code § 105.1)

Wetlands – Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas. (25 Pa. Code § 105.1). As provided in 25 Pa. Code § 105.17, wetlands are categorized as either Exceptional Value (EV) wetlands or other wetlands.

II. ALTERNATIVES ANALYSIS

A. Background

The alternatives analysis process is integral to evaluating compliance under Chapter 105. The concepts DEP uses to evaluate alternatives can be found in the definitions of: mitigation under 25 Pa. Code § 105.1 (e.g., avoid and minimize impacts); water dependency under 25 Pa. Code §§ 105.13(e)(1)(iii)(D), 105.13(e)(1)(x)(C),

105.13(f)(4)(iv), and 105.14(b)(7); alternatives analysis under 25 Pa. Code §105.13(e)(1)(viii); environmental, social, and economic balancing under 25 Pa. Code § 105.16; and, for permitting of structures and activities in wetlands, various additional criteria set forth at 25 Pa. Code § 105.18a.

1. Alternatives Analysis Submission – An alternatives analysis, in part, is documentation of the avoidance and minimization process. Applicants should reference application instructions on when to submit an alternatives analysis. Any application for a structure or activity which requires a written permit under 25 Pa. Code § 105.11(a) or a DEP-approved Environmental Assessment under 25 Pa. Code § 105.15 must include an alternatives analysis where one is required in the application materials. An alternatives analysis is not a submission requirement for general permit registrations, or when the requirements of a permit are waived under § 105.12(a) (except for when an environmental assessment approval is required, such as in § 105.12(a)(11) and § 105.12(a)(16)) or for emergency permits.

   While an alternatives analysis is not a required submission with general permit registrations, there are project scenarios where an alternatives analysis may be required. It is important to note that the general permits have conditions that require avoidance and minimization (e.g., General Permit 7, Condition 13.X). General permit registrations or waived activities which are part of an overall project requiring a permit application or authorization requiring an Environmental Assessment under 25 Pa. Code § 105.15 must have the waiver and general permit impacts included in the alternatives analysis for the overall project.

2. Alternatives Analysis Core Concepts – An alternatives analysis is an information requirement under 25 Pa. Code § 105.13(e)(1)(viii), where it is described as "a detailed analysis of alternatives to the proposed action, including alternative locations, routings or designs to avoid or minimize adverse environmental impacts." In general, most alternatives analyses will include documentation and discussion of both location and design considerations to demonstrate avoidance and minimization.

   Although the alternatives analysis criteria under 25 Pa. Code § 105.18a apply specifically to wetlands, similar concepts apply to all aquatic resources and sensitive features. The term "practicable" is used within 25 Pa. Code §§ 105.18a, 105.162, and 105.422. In all cases, the term "practicable" is interpreted based on its commonly understood meaning which is, according to the dictionary at www.merriam-webster.com, "capable of being used". In this document, the term "practicable" and its common meaning are applicable to the entire alternatives analysis. The alternatives analysis must demonstrate that alternatives to the proposed project which avoid or minimize impacts are not capable of being used.

   Avoidance and minimization of adverse impacts to all aquatic resources and the environment is required in accordance with 25 Pa. Code §§ 105.1 (relating to the definition of "mitigation"), 105.13(e)(1)(viii) (relating to when an alternatives analysis is required), 105.14(b)(7) (relating to water dependency), 105.13(e)(1)(iii) (relating to water dependency), 105.13(e)(1)(x)(C) (relating to

water dependency), 105.13(f)(4)(iv) (relating to water dependency), 105.13(e)(1)(ix) (relating to a mitigation plan), 105.18a (relating to permitting of structures and activities in wetlands), and 105.16(a) (relating to avoidance, minimization, and mitigation). DEP must rely on an applicant's demonstration of how impacts have been avoided and minimized as required under 25 Pa. Code §§ 105.1, 105.13, 105.14, 105.16, 105.18a, and 105.21 when reviewing proposed projects. Therefore, DEP encourages applicants to provide as much detailed information as possible documenting the alternatives considered and the process followed to arrive at the proposed project.

Considering project alternatives at multiple scales (i.e., overall project and site-specific) and then providing evidence-based information in the demonstration and discussion of project alternatives strengthens the efficacy of the alternatives analysis by helping DEP review staff better understand what constraints the applicant was limited by in planning and designing the proposed project. Loss of aquatic resources and sensitive features should only be considered when impacts are deemed to be both necessary and unavoidable. While impacts to and loss of streams and wetlands may require compensatory mitigation, that is beyond the scope of this guidance.

3. Alternatives Analysis and Applicant Considerations – An alternatives analysis is the project applicant's written documentation of efforts to avoid and minimize environmental impacts. The alternatives analysis shall demonstrate, with reliable and convincing evidence, that there are no other practicable alternatives that would avoid impacts and minimize impacts to aquatic resources or sensitive features. Additionally, the development of an alternatives analysis should be a thorough, iterative process that evaluates the practicability and availability of reasonable alternatives to meet the basic project purpose and should be reflective of project type, scope, and proposed impacts. Evaluating alternatives may involve considering such factors to avoid and minimize impacts to aquatic resources and sensitive features as: determining the availability of other properties; relocating proposed structures or activities; altering construction methods; or changing the size, scope, configuration, or density of the structures or activities.

   The alternatives analysis should include all impacts of the overall project in the evaluation, permanent and temporary, direct, indirect, secondary, and cumulative. As part of this analysis, an applicant should consider present conditions and the effects of reasonably foreseeable future development. DEP will consider a factor both reasonable and foreseeable if it is known or could be known with applied due diligence, or may be predicted by modeling or projection (e.g., growth rates or planning documents).

   An alternatives analysis should be consistent with existing policy and guidance, including this guidance document, DEP's *Environmental Assessment Form* (3150-PM-BWEW0017), and DEP's *Comprehensive Environmental Assessment of Proposed Project Impacts for Chapter 105 Water Obstruction and Encroachment Permit Applications* (310-2137-006), along with any additional guidance, as applicable. Information related to additional environmental policies

and guidance can be found in this document at Section II.D, "Common Elements of an Alternatives Analysis".

B. Location Alternatives

The purpose of the location alternatives analysis is to identify the most appropriate land parcel(s) for the project to be sited upon. Alternatives analyses should almost always include a location alternatives analysis. While there may be circumstances in which an alternative locations analysis may not be necessary, those circumstances should be considered an exception. Some of these exception circumstances are discussed within this guidance document. When locations are evaluated, an applicant should consider areas and alignments located not only on land parcels currently owned by the applicant, but also land parcels that could reasonably be obtained, utilized, expanded, or managed to fulfill the basic purpose of the project. If a project has unique constraints or limiting factors that influence location selection and that may prevent an alternative location from fulfilling the basic project purpose or that may make an alternative location impracticable, an applicant should provide that information for review within the alternatives analysis.

The Department acknowledges that some applicants may be able to exercise the right of eminent domain in the routing or siting of their project. The Chapter 105 regulations do not convey any property rights, nor does the Department have authority to approve applicants' use or exercise of eminent domain rights. An applicant who has the right of eminent domain would possibly have other alternative locations or routes available. As part of their alternatives analysis, this factor should be clearly identified where this right has been exercised and, where applicable, an applicant should explain how this decision affected the alternatives considered.

For location alternatives, field delineations of aquatic resources may not be possible if permission to access the parcel(s) cannot be obtained. In these circumstances, field observations made from a neighboring property, including ROWs along public roads or utilities (by permission), or from public lands can be used to infer and estimate the extent and types of aquatic resources. Digital data resources can also be used to conduct a cursory analysis or to corroborate field observations where access has been denied.

The approximate locations of many watercourses and wetlands and other bodies of water can be identified or inferred utilizing data available from several resources, such as the modeled and restorable wetlands layers available on the Pennsylvania Spatial Data Access (PASDA) portal (see the appendix in Section VI.B of this guidance document for further details). Any single data resource should not be relied upon on its own, but should be used in concert with other sources of information and data where possible. Digital mapping resources are not meant to be precise and can be inaccurate due to the limitations of the underlying data collection methods. In addition to data resources that may identify potential aquatic resources, the Department's expectation is that multiple years of aerials photographs and other data resources will be used in combination and interpreted by persons who are experienced in aquatic resource identification and who are familiar with the data resources utilized.

An alternatives analysis must document that impacts have been avoided and minimized with reliable and convincing evidence; therefore, the mapping data and analysis of the data must be reliable. Applicants should use all best available resources for this work, including additional resources not yet developed or available at the time this guidance was finalized. For a list of some resources current as of the finalization of this guidance document that may be useful, see the appendix to this guidance document at Section VI.B, "Data Resource List".

C. Design Avoidance and Minimization

The purpose of the onsite, or design avoidance and minimization, alternatives analysis is to identify opportunities to first avoid, and then minimize, any impacts to aquatic resources and sensitive features after a project location or corridor has been selected. This includes consideration of the reduction the size, scope, configuration, or density of the project or project elements and other design aspects that would result in fewer or less severe adverse impacts to accomplish the basic project purpose. An applicant should demonstrate that all necessary steps have been taken to avoid and minimize aquatic resource and sensitive feature impacts by considering alternate onsite designs, routings, layouts, logistics, engineering, and construction techniques.

D. Common Elements of an Alternatives Analysis

Nearly all alternatives analyses consist of both location alternatives and design alternatives considered to avoid and minimize aquatic resources and impacts. These considerations are project-specific, and the degree of details included in the analysis should be commensurate with the project impacts. As such, the components and level of detail included in an alternatives analysis will vary across different types and scales of projects. Even so, the following components of an alternatives analysis are essential to include in all dam, water obstruction, and encroachment permit applications and should also be considered on a project-specific basis. Please note this list is not exhaustive.

1. Aquatic Resource Impacts – An alternatives analysis shall evaluate impacts to aquatic resources and demonstrate how impacts were avoided and minimized. Obtaining an accurate identification or delineation of the aquatic resources at risk is critical to the process of evaluating and comparing impacts of alternatives. Field delineations of these resources may not be possible for location alternatives if permission to access the parcel(s) cannot be obtained. Section II.B of this guidance document provides information pertaining to evaluation of alternative locations. For design considerations – meaning evaluating a chosen site or corridor – applicants shall not rely solely upon desktop resources for identifying wetlands, streams, and other aquatic resources. Rather, a field delineation of all regulated waters of this Commonwealth, including wetlands, must be conducted. See 25 Pa. Code §§ 105.13(e)(1)(i)(A) and 105.13(f)(1)(i).

    a) Wetland Impacts – In addition to the alternatives analysis criteria which apply to all aquatic resources, wetlands have specific alternatives analysis criteria at 25 Pa. Code § 105.18a. Applicants should read and understand when these wetland-specific requirements may be applicable and what effect they might

have on project alternatives. For Exceptional Value (EV) wetlands, see 25 Pa. Code § 105.18a(a); for other wetlands, (non-EV) see 25 Pa. Code § 105.18a(b).

Applicants should familiarize themselves with the different requirements for EV wetlands versus non-EV wetlands, particularly the concept of water dependency, when formulating the alternatives demonstration. In addition, it is important to note that both § 105.18a(a) and § 105.18a(b) state that the applicant must affirmatively demonstrate in writing the items required under each subsection of the regulations.

2. Existing Utilities, Infrastructure, and Easements or ROWs – An alternatives analysis should evaluate the constructability and feasibility of a project with respect to existing utilities, infrastructure, and easements or ROWs. If the project will require extending a service such as a public water line, sewer line, or natural gas line, the availability of existing utilities should be considered. In addition, determining the location of existing utilities, existing easements or ROWs, and the potential for co-location of utility lines within the same ROW or immediately adjacent to the existing ROW can affect the project's alignment, configuration, and alternatives (see Section III.B.5 of this guidance document for more information on co-location). If additional utilities are necessary, the alternatives analysis should include any associated impacts from those utilities. The alternatives analysis should include a discussion and associated documentation that existing utilities and infrastructure, needed utilities and infrastructure, and easements or ROWs have been considered and how those considerations affected the choice of the proposed project.

3. Site Constraints – An alternatives analysis should consider such items as: whether the size of the possible site(s) are sufficient to accomplish the basic project purpose; whether the possible site(s) are appropriate regarding constructability; and whether the project could inherently be more hazardous to construct, operate, and maintain at the proposed site(s) compared with other practicable alternative locations. Sites that could be more hazardous might include: contaminated sites; sites on steep slopes, highly erodible soils, or other potential geologic hazards (e.g., sinkholes); and sites that could compromise public health, safety, or the environment for other reasons. Applicants must provide as much detailed documentation as is practicable to complete the required demonstration when site constraints affect the evaluation of alternatives.

4. Existing Technology – An alternatives analysis should consider prevailing practices, current knowledge, and emerging research from the scientific, environmental, and engineering disciplines, as well as various construction techniques and technologies utilized by the construction industries. The analysis should include discussion and support, through documentation and scientific reasoning, as to why a technology was selected as the proposed alternative. The Department recommends reviewing available DEP guidance on technology, including any available trenchless technology guidance.

5. Stormwater and Floodplain Management – An applicant must meet the post-construction stormwater management (PCSM) requirements of 25 Pa. Code § 102.8. Chapter 105 applications will be reviewed for consistency with State and local floodplain and stormwater management programs under 25 Pa. Code §§ 105.14(b)(9) (relating to review of applications state and local floodplain management), 105.13(e)(1)(v) (relating to stormwater management analysis), and 105.13(e)(1)(vi) (relating to floodplain management analysis). There may be circumstances where stormwater management requirements may place constraints on alternative locations, routings, or designs. In these circumstances, the applicant should document these constraints in the alternatives analysis.

6. Environmental and Policy Considerations – DEP develops and implements several policies intended to coordinate, avoid conflicts, and promote joint compliance with associated regulations and ordinances of local, State, and Federal agencies with respect to aquatic resources and sensitive features. In addition, Chapter 105 specifically requires DEP to evaluate these and certain other environmental considerations, many of which are captured in the alternatives analysis submitted by the applicant. The following paragraphs discuss how certain policies and considerations can incorporated into the alternatives demonstration.

   a) *Threatened and Endangered Species, Special Concern Species; Rare and Significant Ecological Features* – Chapter 105 applications will be reviewed for effects on fish, wildlife, aquatic habitat, and other significant environmental factors, under 25 Pa. Code § 105.14(b)(4). It is the policy of DEP to fully support the protection of threatened and endangered (T&E) species and special concern species. If a proposed project is designed to avoid or minimize impacts to an aquatic resource, species, or sensitive feature but would have a negative effect on T&E species or special concern species, as defined in DEP's *Policy for Pennsylvania Natural Diversity Inventory (PNDI) Coordination During Permit Review and Evaluation* (021-0200-011), the applicant should consider alternative locations or designs. Comments received from the jurisdictional agency responsible for the T&E species, special concern species, and rare and significant ecological features should be used to assist in the consideration of alternatives and the selection of a proposed project location and design.

      Applicants should carefully consider alternatives through the lens of the Chapter 105 regulations prior to submitting a permit application, registration or other approval. Criteria relating to a project's effect on T&E species are found throughout Chapter 105, including: 25 Pa. Code §§ 105.13(e)(1)(x) (relating to impacts analysis), 105.14(b)(4) (relating to review of the effect on fish, wildlife, etc.), 105.14(b)(6) (relating to the review of compliance with applicable laws of the Fish and Boat Commission), 105.16(c) (relating to impacts upon public natural resources), 105.17(1) (relating to exceptional value wetlands), 105.381(e) (related to location of dredging), 105.401(3) (relating to permit applications for discharges of dredged of fill material), and 105.411 (relating to criteria for approval of discharges of dredged or fill material).

In addition, see DEP's *Policy for Pennsylvania Natural Diversity Inventory (PNDI) Coordination During Permit Review and Evaluation* (021-0200-001).

b) *Local Comprehensive Plans and Zoning Ordinances* – Acts 67, 68, and 127 of 2000 (Acts 67, 68, and 127) amended the Pennsylvania Municipalities Planning Code (MPC) to provide new tools for local governments to plan for and manage growth. Act 67 and Act 68 amended sections of the MPC directing that state agencies "shall consider and may rely upon comprehensive plans and zoning ordinances when reviewing applications for the funding or permitting of infrastructure or facilities."

In accordance with DEP's *Policy for Consideration of Local Comprehensive Plans and Zoning Ordinances in DEP Review of Permits/Authorizations for Facilities and Infrastructure* (012-0200-001), comprehensive planning and zoning ordinances should be considered when selecting a proposed alternative. DEP notes that applicants should be sure when citing zoning constraints, that if a parcel was rezoned to facilitate the proposed project, the possibility of re-zoning the other alternatives should also be included within the alternatives analysis.

c) *Prime Agricultural Lands* – In accordance with DEP's *Agricultural Land Preservation Policy* (012-0700-002), it is the policy of DEP to seek to help protect the Commonwealth's prime agricultural land from irreversible conversion to uses that result in its loss as an agricultural or conservation resource. Applicants should evaluate impacts to agricultural lands when considering alternatives. See also 25 Pa. Code § 105.13(e)(1)(x) (relating to impacts analysis).

d) *Archeological Resources and Historic Structures* – Chapter 105 applications must include determination of impacts on cultural, archeological, and historical landmarks under 25 Pa. Code §§ 105.13(e)(1)(x) (relating to impacts analysis) and 105.14(b)(5) (relating to review of application and cultural, historic, or archeological impacts). In accordance with DEP's *Implementation of the Pennsylvania State History Code: Policy and Procedures for Applicants for DEP Permits and Plan Approvals* (012-0700-001), it is the policy of DEP to cooperate with the Pennsylvania Historical and Museum Commission (PHMC) in the preservation, protection, and investigation of significant archaeological resources and historic structures. An alternatives analysis should include information regarding coordination with the PHMC's Pennsylvania State Historic Preservation Office (PA SHPO) as applicable. Information about PHMC coordination can be found on PA SHPO's Pennsylvania's Historic and Archaeological Resource Exchange (PA-SHARE) and on DEP's permitting webpage.

e) *Special Protection Waters* – Chapter 105 applications will be reviewed for the effect of a proposed project on water quality and for consistency with State antidegradation requirements under 25 Pa. Code §§ 105.14(b)(4)

(relating to review of application effect on water quality, habitat, etc.), 105.14(b)(11) (relating to review of application consistency with antidegradation), 105.17, 105.18a(a) (relating to permitting of exceptional value wetland impacts), and 105.18a(b) (relating to permitting of other wetland impacts). Under 25 Pa. Code Chapter 93 (relating to water quality standards), surface waters of this Commonwealth are protected for a variety of protected water uses, including aquatic life uses, water supply uses, and special protection uses. Special protection uses consist of Exceptional Value Waters (EV) and High Quality Waters (HQ). When evaluating alternatives, applicants should consider protected water uses, including designated and existing uses, where applicable. See also 25 Pa. Code § 105.13(e)(1)(x) (relating to impacts analysis).

f) *Scenic Rivers* – Under 25 Pa. Code §§ 105.13(e)(1)(x) (relating to impacts analysis), 105.14(b)(10) (relating to review of application consistency with wild, and scenic rivers), and 105.16(c)(1) (relating to adverse impacts to public natural resources), Chapter 105 applications will be reviewed for consistency with the designations of wild, scenic, and recreational streams under the Federal Wild and Scenic Rivers Act of 1968 (16 U.S.C.A. §§ 1271-1287) and the Pennsylvania Scenic Rivers Act. Federal and state legislation allows waterway segments to be designated as part of the Scenic Rivers System. Scenic rivers statutes (i.e., the Federal Wild and Scenic Rivers Act of 1968 and the Pennsylvania Scenic Rivers Act) intend to protect the natural, aesthetic, and recreational values of specially designated waterways through sound conservation policies and management practices. These protection efforts are largely carried out through a partnership between the Pennsylvania Department of Conservation and Natural Resources (DCNR) and other state agencies, whereby construction projects in the vicinity of a designated Scenic River are required to undergo a more rigorous permitting process and may be required to adjust the project design or construction practices to ensure that the natural and aesthetic values of the waterway are maintained. (Wild and Scenic Rivers Act of 1968, Section 7; Pennsylvania Scenic Rivers Act, Section 9).

E. Cost as an Element of an Alternatives Analysis

Many times alternatives analyses can document that alternatives are not practicable without using costs. However, sometimes costs are an important factor of the analyses. Further, costs are complicated to include in alternatives analyses because they inherently are abstract to the aquatic resources and can be difficult to relate to overall project practicability. *The Department recommends that costs only be included in an alternatives analysis demonstration when they are a significant factor in the consideration of alternative locations, routings, or designs, or will aid in the Department's understanding of such alternatives and their practicability*. An alternatives analysis should not be based on any one factor alone, including cost.

If an applicant includes cost in the alternatives analysis, they should provide a comparative cost analysis that affirmatively demonstrates with reliable and convincing

evidence how cost impacted the conclusion. Although an alternative may be more expensive, that fact alone does not automatically justify a conclusion that the more expensive alternative is impracticable. To demonstrate how an alternative with fewer or less severe impacts to aquatic resources and sensitive features is not the proposed project's location, routing, or design due to costs, the applicant's analysis should provide clear and appropriate documentation of such findings. When using costs, an alternatives analysis is expected to provide detailed documentation of project costs, the cost of alternatives, and the thresholds forming the basis for a project's practicability in support of the conclusions reached.

F. 401 Water Quality Certification and Chapter 105 Alternatives Analysis

If a project requires project-specific Water Quality Certification (WQC) under Section 401 of the Federal Clean Water Act (33 U.S.C. § 1341), the applicant must request the WQC from DEP. The federal permitting or licensing authority may through their regulatory authority (e.g., Federal Energy Regulatory Commission Natural Gas Act license, U.S. Army Corps of Engineers Civil Works Projects) determine the location or route of the project prior to the submission of a Chapter 105 permit. In these instances, applicants should include the alternatives analysis for alternative routes as documentation accompanying the request for WQC. The alternatives provided with the WQC should be for the location or route selection which is determined though the federal authority's process and should be consistent with the requirements under Chapter 105. See Section III.B of this guidance document for more information, and the appendix to this guidance document at Section VI.A for information on how Chapter 105 alternatives analyses related to requirements under the National Environmental Policy Act (NEPA).

III. ENVIRONMENTAL AND PROJECT-SPECIFIC CONSIDERATIONS

DEP has identified five general categories where alternative considerations may vary by project type. Some potential considerations are listed below by category. Applicants should read through all these considerations, as their project may fall under more than one category. While the alternatives analysis should be commensurate with the proposed impacts, applicants should first seek to avoid, then minimize all impacts to aquatic resources and sensitive features. As previously noted in this guidance document, DEP also expects that all practicable locational and design alternatives be discussed in the alternatives analysis. There are some limited circumstances in which analysis of alternate locations may not be necessary due to clear and obvious reasons, often with in-kind structure replacement (e.g., bridge replacement at same location, see Section III.C below). However, this does not negate the need for a site-specific design, avoidance, and minimization analysis. In other circumstances, even projects which may not typically need alternate site analyses may be required to submit one if warranted by unique, rare, or complex circumstances where typical construction methods or best management practices (BMPs) do not sufficiently ensure protection of public health, safety, property, or the environment.

A. Land Development Projects

Land development projects include residential, commercial, industrial, and institutional developments. Impacts to aquatic resources and sensitive features via land development projects can be associated with the construction of elements such as buildings, parking

lots, storm water control facilities, utility lines, docks, access roads, and trails. Analysis of both location alternatives and design avoidance and minimization alternatives are appropriate for new development sites. As such, applicants should be proactive in coordinating with local municipalities when evaluating alternative sites and developing alternative site designs that avoid and minimize impacts to aquatic resources and sensitive features, as it may be practicable to obtain waivers or relief from local ordinances for a less impactful alternative. In addition, county, state, and federal regulations may limit available development options. Land development sites share common issues but are also somewhat unique in terms of site design, and in the type and extent of impacts.

Land development sites and the associated variation in their designs can affect aquatic resources and sensitive features in various ways. These types of projects are highly varied in size, basic purpose, features, and complexity. While detailed guidance for all the possible variations in projects is not possible, there are common overarching elements which can set a framework for an onsite analysis. In general, land development projects should include in the alternatives analysis onsite alternatives to reduce the impacts onsite. This typically includes, but is not limited to, the following overarching concepts: reducing the size or amount of structures while still meeting the basic project purpose; evaluating various alternative locations for structures; alternative structure designs; alternative types, sizes, and layouts of facilities (e.g., stormwater control facilities, roads); steeper slopes and retaining walls; and specific dam, water obstruction, or encroachment design practices or technologies to reduce impacts. Changing the design or footprint of a land development project can affect: the quality, rate, and volume of stormwater runoff conveyed from the development to the receiving body of water; the extent of infrastructure required to accommodate the development; and the severity of direct, indirect, cumulative, and secondary impacts to aquatic resources and sensitive features.

B. Linear Utility Projects

A linear utility project is a type of project that, in general, has an elongated shape relative to its endpoints and has a construction corridor of varying width. Examples include oil and gas pipelines, water lines, sanitary sewers, roads, and energy/power transmission lines. Due to their linear nature, these projects may have multiple aquatic resource and sensitive feature impacts. In addition to the impacts associated with the project, impacts of the ancillary features (e.g., temporary workspaces, access roads, valve sites, meter stations, manholes, compressor stations), and of the long-term operation and maintenance needs associated with the project, are important considerations that should be incorporated during the development of an alternatives analysis.

Typically, the project type will dictate the necessary corridor width, while terrain, local ordinances, and other factors will affect location and alignment or routing. Although these projects have defined start and endpoints, there is usually some flexibility in their alignment/routing within and among properties. Alignment flexibility can vary based on project type, design, purpose, and other factors. With respect to co-locating or replacing linear utilities projects within existing ROWs, projects that are fully located within an existing ROW may not warrant a location alternatives analysis (see Section III.B.5 below for specifics on co-location). However, projects not fully located within an existing ROW will typically require an offsite or location alternatives analysis. If sensitive

features are present within an existing ROW where a project is proposed, this is a situation where alternative locations should be considered and evaluated. Some linear projects may include a NEPA assessment under federal law, but as noted in Section II.A of this guidance document, a NEPA alternatives analysis may not be sufficient to satisfy the requirements of a Chapter 105 alternatives analysis (see the appendix to this guidance document at Section VI.A).

Some linear projects are regulated by the Federal Energy Regulatory Commission (FERC). DEP strongly recommends early coordination with state agencies during FERC filing, the WQC process under Section 401 of the Federal Clean Water Act, and any other related processes. This early coordination will allow DEP to evaluate and weigh in on the proposed routing and associated alternatives. With early coordination, applications later submitted to DEP are less likely to encounter challenging circumstances and, based on the early coordination with DEP, should be designed to have avoided and minimized impacts to aquatic resources and sensitive features to the maximum extent practicable. See Section II.F of this guidance document for additional information regarding WQCs for FERC-regulated projects.

In addition to the items discussed in this guidance document at Section II.D, "Common Elements of an Alternatives Analysis", there are additional components specific to linear utility projects that warrant additional discussion. The following is not intended to be an exhaustive list; other considerations may be applicable under site-specific circumstances or unique project constraints.

1. Open-Cut vs. Trenchless Technologies – DEP expects that some projects should evaluate the use of trenchless technologies in the alternatives analysis, but notes that not all projects will or should use these technologies. DEP strongly recommends that trenchless technologies be considered for special protection waters, sensitive resources, and projects with greater potential effects on aquatic resources. Trenchless construction technologies may reduce the impacts and effects on aquatic resources versus open-cut methods; however, it should also be restated that the alternatives analysis should be commensurate with the impacts and effects on aquatic resources and sensitive features. While the Department encourages and recommends consideration of the use of such technologies to avoid and minimize impacts, it also understands that these technologies are not always practicable or may carry certain risks. These risks vary based on location, technology, and other considerations, and can be discussed in an alternatives analysis. Applicants should refer to any available DEP guidance regarding trenchless technology for additional information or considerations.

2. Special Protection Waters – Regardless of technologies utilized to avoid and minimize impacts to special protection waters, additional consideration should be given to BMPs and design alternatives that further avoid and minimize impacts where such sensitive resources are at risk.

3. Mosaics and Multiple Resource Crossings – There may be instances where a linear utility project encounters a mosaic of multiple aquatic resources and sensitive features in a concentrated area, such as a wetland and stream complex, or a multi-threaded headwater stream system. In these circumstances, applicants

should evaluate alternatives and potential effects not just on the individual resources but also on avoiding and minimizing impacts on the broader area as an interrelated ecosystem. Applicants should attempt to adjust the project alignment to avoid and minimize long-term or permanent impacts.

4. Right-of-Way Reduction – Reduction of the ROW through aquatic resources and sensitive features should always be considered as part of demonstrated considerations for impact avoidance and minimization. In addition, efforts should be made to avoid and minimize the placement of temporary workspaces within all aquatic resources and sensitive features.

5. Co-location – Co-location involves installation of a new facility either within or adjacent to an existing ROW corridor or previously disturbed area. These locations could include existing pipeline, overhead electrical, and roadway corridors or other areas that were previously disturbed. DEP recognizes that co-location is not always practicable or the least-impacting alternative. However, applicants should, whenever possible, consider using existing maintained or active ROWs, previously disturbed areas, or open lands as an alternative to using undisturbed areas, restored areas, or regenerated areas with forest or shrub habitat. Applicants should also consider locating ancillary features, such as temporary workspaces, in active ROWs, previously disturbed areas, or open areas. Applicants are encouraged to work with other operators and entities to share ROWs and thereby maximize co-location and the use of previously disturbed and open spaces.

C. Transportation Projects

Transportation projects cover a wide range of activities that include roadways, highways, bridges, culverts, rail lines, airports, ports, rest areas, bus routes, bike lanes, walking paths, and other associated support facilities. As with linear utility projects, some transportation projects may include a NEPA assessment as required under federal law, but, as noted in Section II.A of this guidance document, a NEPA alternatives analysis may not completely satisfy the requirements of a Chapter 105 alternatives analysis. Many transportation projects are constructed out of necessity to improve safety, accessibility, and mobility for the public, but this does not negate the need for an alternatives analysis. Although their functions are varied, transportation projects generally fall into one of the following three categories:

1. New Alignments and Facilities – Analysis of both location and design elements to avoid and minimize impacts to aquatic resources and sensitive features are anticipated for these transportation project types. New roads or new alignments can share many similarities with linear utilities in alternatives analyses. The summation of the impacts for each of the alternative location alignments should be documented and justification should be provided for the proposed alignment. In addition, individual activities impacting aquatic resources and sensitive features for the proposed alternative should be avoided and minimized. See Section III.B of this guidance document for additional information.

2. Existing Alignments and Facility Expansions – In most cases, an analysis of a location alternative is not anticipated for transportation projects on existing alignments since the structure is already in place. However, there may be circumstances related to project purpose, scope, and associated impacts to aquatic resources and sensitive features that may require that other location or design alternatives be explored. Impacts to aquatic resources and sensitive features should be avoided and minimized to the extent practicable regardless of the project or permit type. Applicants are responsible for providing DEP with any information necessary to help application reviewers understand the project constraints in circumstances when an alternative location to the proposed project is not practicable. Linear transportation projects along existing alignments share similarities with linear utility lines; see Section III.B of this guidance document for additional information. Transportation projects of existing facilities share similarities with land development projects; see Section III.A of this guidance document for additional information.

3. Bridge or Culvert Replacement – In most cases, an analysis of a location alternative is not anticipated for these types of transportation projects since the structure is already in place. However, there may be circumstances related to project purpose, scope, and associated impacts to aquatic resources and sensitive features that may require that other location or design alternatives to be explored. Impacts to regulated waters of this Commonwealth must be avoided and minimized to the extent practicable, including use of design alternatives. Applicants are responsible for providing DEP with any information necessary to help application reviewers understand the project constraints in circumstances when an alternative location or design to the proposed project is not practicable.

D. Pollution Abatement Projects

Pollution abatement projects cover a wide range of activities that include, but are not limited to, abandoned mine reclamation, abandoned mine drainage treatment, and brownfields reclamation. The intent of pollution abatement projects is the reduction or elimination of an environmental or health and safety concern. Since pollution abatement projects are intended to address or mitigate a site-specific issue, typically a detailed location alternatives analysis is not necessary for these types of projects.

Design alternatives for these types of projects should still be considered to avoid and minimize impacts to aquatic resource and sensitive features. Minimization includes limiting the degree and magnitude of impacts to aquatic resources and sensitive features. Many types of pollution abatement projects deal with issues not directly related to the aquatic resource but may need to impact the aquatic resource to achieve project goals. These pollution abatement projects are important to the environment and to public health and safety. While alternatives should be considered to avoid and minimize impacts to aquatic resources, DEP also understands that there are typically limited pollution abatement options. The alternatives analysis for these projects should be commensurate with the impacts and the practicable pollution abatement options available. DEP strongly recommends that applicants reach out to DEP during the pre-application process when proposing these types of projects.

E. Restoration and Enhancement Projects

Restoration projects are those that reestablish or rehabilitate aquatic resources to natural characteristics and functions. Although not considered restoration, enhancement projects are those that may provide some limited improvement to an aquatic resource by elevating a particular function (e.g., habitat or species diversity) or provide some pollution reduction benefit (e.g., eliminating active erosion along a stream through bank stabilization). Restoration and enhancement projects intend to reduce or eliminate site-specific underlying causes of degradation and their effects on the aquatic resource. Typically, a detailed location alternatives analysis is not necessary for restoration and enhancement projects. Both restoration and enhancement projects should demonstrate how the proposed project provides for aquatic resource improvement. Restoration projects are required to provide a more detailed demonstration in the Environmental Assessment, and it is acceptable to provide a cross-reference to this in the alternatives analysis.

Alternatives to avoid and minimize adverse impacts may only need to be a brief synopsis of the effects of the project. Impacts to other aquatic resource types may be necessary to perform adequate restoration or enhancement (e.g., wetland impacts necessary to provide effective stream restoration). Designs which must impact additional aquatic resources to fulfill the restoration or enhancement objectives should identify the impacts and provide an explanation within the alternatives analysis.

If the Department, in its review, determines that the proposed project, or portions thereof, do not result in aquatic resource improvement, it may seek additional information or analyses from the applicant. Although alternatives to avoid and minimize adverse impacts are not typically necessary for these projects, other proposed water obstructions and encroachments (e.g., bridges, livestock crossings, utilities) must be included in the discussion of alternatives considered to avoid and minimize impacts.

IV. ALTERNATIVES ANALYSIS PROCESS AND TEMPLATE OF ITEMS TO SUBMIT TO DEP

The following process description and template checklist provide a framework for evaluating alternatives and regulatory concepts relating to alternatives under 25 Pa. Code §§ 105.1 (relating to the definition of *mitigation*), 105.13(e)(1)(iii)(D) (relating to water dependency), 105.13(e)(1)(viii) (relating to alternatives analysis), 105.13(e)(1)(x)(C) (relating to water dependency), 105.13(f)(4)(iv) (relating to water dependency), 105.14(b)(7) (relating to review of applications and water dependency), 105.16 (relating to environmental, social, and economic balancing), 105.18a(a) (relating to permitting in exceptional value wetlands), and 105.18a(b) (relating to permitting in other wetlands) and offer guidance regarding what should be submitted to DEP. The following process description and template checklist are not intended to be standalone documents. Instead, the process description and template checklist should be considered integral parts of this guidance document and should not be utilized without thorough comprehensive review of this guidance document.

A. Alternatives Analysis Process

As referenced throughout this guidance document, an alternatives analysis is expected to be commensurate with project impacts. The analysis should be prepared by individuals with appropriate experience, education, training, and familiarity with state regulations. An alternatives analysis should document the proposed impacts to aquatic resources and sensitive features and should affirmatively demonstrate with reliable and convincing evidence that impacts have been, first, avoided, and, second, minimized. The alternatives analysis is an iterative process that should begin during the initial project planning phase. It is not appropriate to wait until after the project has been designed to begin exploring alternatives.

DEP recommends that initial assessments of properties for anticipated impacts to aquatic resources and sensitive features occur during the early phases of project planning. Project constraints associated with the aquatic resources and sensitive features to be impacted, such as those discussed in Sections II and III of this guidance document should be understood and incorporated into project planning.

It may not be possible to field-delineate all aquatic resources and sensitive features along alternative routes or at alternative land parcels during the location alternatives analysis process. As mentioned in Section II.D.1 of this guidance document, the approximate locations of many watercourses and wetlands can be identified using data available from various digital mapping resources. If digital mapping resources are used, the same digital mapping resources should be used in the alternatives analysis to compare aquatic resources and sensitive features on the proposed site to aquatic resources and sensitive features on alternative sites. However, it must be recognized that such mapping resources are not always precise and may be inadequate for use for other purposes due to the limitations of the data collection method(s); therefore, DEP recommends that interpretation of any environmental mapping data be performed by someone with experience in aquatic resource identification. See the appendix at Section VI.B of this guidance document for a list of data resources that may be useful.

After location alternatives have been explored and appropriate site(s) selected, the applicant should complete a full delineation of the aquatic resources and sensitive features. Applicants should not solely rely upon desktop resources for identifying wetlands, streams, and other aquatic resources during the design avoidance and minimization alternatives analysis. Rather, a field delineation of all regulated waters of this Commonwealth, including wetlands, must be conducted (25 Pa. Code §§ 105.13(e)(1)(i)(A) (relating to permit applications and delineation of waters of this Commonwealth) and 105.13(f)(1)(i)) (relating to small project applications and delineation of waters of this Commonwealth)).

It is important to remember that, if avoidance and minimization of aquatic and sensitive resource impacts is not practicable due to issues such as protection of public health and safety, pollution abatement, or other factors, the applicant must accurately assess and present these issues in the alternatives analysis.

B. Template of Items to Submit to DEP

The template below is a useful tool, but is not required to be submitted to DEP, and additional information or factors not listed in this template may be applicable for specific projects.

☐			**Water Dependency / Purpose Narrative** – This narrative should be contained within the project description. See DEP's *Environmental Assessment Form* (3150-PM-BWEW0017) for more information.
☐			**Location Alternatives Narrative, Documentation, and Tables** – Detailing the proposed and alternate location(s). This narrative should discuss and quantify the environmental impacts and should detail site constraints associated with each of the proposed offsite alternatives. See Tables 3a-c in Section IV.C of this guidance document for an example offsite summary table. Documentation should be included to support the narrative.
	☐		**Selected Location Description –** Justification for selection of the proposed alternative should be provided. This description should include the following:
		☐	**Aquatic Resource and Sensitive Feature Impact(s) Description** – Impacts to aquatic resources and sensitive features should be detailed and quantified for the selected alternative. This should be completed for all sensitive features and aquatic resources (as defined in this guidance document) impacted by the project. Applicants should include information regarding resource type and impact acreage, square feet, or linear feet (as appropriate).
		☐	**Other Environmental Considerations** – Other environmental considerations identified within Chapter 105, other environmental resources, environmental policies, and other factors that influenced the selection of the chosen location should be discussed.
		☐	**Project-Specific Factors** – Siting, design, or construction feasibility considerations specific to the proposed project that influenced the selection of the proposed offsite alternative should be discussed.
	☐		**Considered Alternate Location(s) Description(s)** – Alternative locations not utilized or selected should be described and compared. This narrative should include a discussion of environmental impacts and site constraints associated with each offsite alternative. The discussion should detail how aquatic resources were identified for the offsite alternatives (e.g., identify which desktop resources were used) and should quantify the impacts to aquatic resources and sensitive features associated with each alternative site. If an alternative location has fewer environmental impacts than the chosen location, a detailed justification of why the least environmentally impactful alternative is not practicable should be provided.

☐	**Design Avoidance and Minimization Alternatives Narrative, Documentation, and Tables** – Detailing the proposed and alternate design(s). This narrative should discuss avoidance and minimization efforts in addition to detailing site constraints associated with each of the proposed alternatives. See Tables 4a-c in Section IV.C of this guidance document for an example onsite summary table. Documentation should be included to support the narrative.		
	☐	**Selected Design Alternative** – Justification for selection of the proposed alternative should be provided.	
		☐	**Aquatic Resource and Sensitive Feature Impact(s) Description** – With aquatic resources and sensitive features identified and field-delineated for the site, applicants should detail and compare the resource impacts and site constraints associated with each onsite (design) alternative. This should be completed for all sensitive features and aquatic resources (as defined in this guidance document) impacted by the project. Applicants should include information regarding resource type and impact acreage, square feet, or linear feet (as appropriate).
		☐	**Other Environmental Considerations** – Other environmental considerations identified within Chapter 105, other environmental resources, environmental policies, and other factors that influenced the selection of the chosen location should be discussed.
		☐	**Project-Specific Factors** – Siting, design, or construction feasibility considerations specific to the proposed project that influenced the selection of the proposed design alternative.
	☐		**Considered Design Avoidance and Minimization Alternatives Description** – Alternative designs considered but not utilized or selected should be described. If an alternative has less environmental impacts than the proposed alternative, a detailed explanation that takes into consideration construction cost, existing technology, and logistics of why the alternative is not practicable should be provided.
☐	**Location and Design Avoidance and Minimization Alternatives Exhibits** – Include pertinent exhibits (e.g., maps, drawings, and standard details) that depict the proposed impacts to aquatic resources and sensitive features (e.g., crossings, cut/fill, excavations) for all offsite and onsite alternatives. Drawings and maps should include specific details regarding layout, design, and construction methodologies.		
☐	**Data Resources** – List of data resources utilized.		

C. Example Location and Design Avoidance and Minimization Alternatives Analysis Summary Tables

As discussed earlier in this guidance document, alternative considerations vary depending on the type of project. Alternatives analyses should almost always include a location alternatives analysis. While there may be circumstances in which analysis of alternate locations may not be necessary, those circumstances should be considered as exceptions. However, if a an exception to what is typical could apply, then applicants may be required to provide site-specific discussions of location alternatives if warranted by unique, rare, or complex circumstances where typical construction methods or BMPs do not sufficiently ensure protection of public health, safety, or the environment.

The following tables are examples of what could be submitted to DEP as a supplement to the alternatives analysis narrative. *Due to the unique nature of different project types, applicants who choose to use these example tables should modify the tables to include pertinent information as appropriate*. These tables should succinctly describe both the location alternatives and design avoidance and minimization alternatives evaluated during the project planning process. *These tables should be used to support the alternatives analysis narrative, not to replace the alternatives analysis narrative*. Tables such as these example tables are optional, but can be beneficial for the applicant and DEP for projects with more complex alternatives analyses.

1. Location Alternatives Summary Table – A location alternatives summary table should include information regarding sites owned by the applicant and sites not owned by the applicant which could reasonably be obtained, utilized, expanded, or managed to fulfill the basic purpose of the proposed project. If the project is linear in nature (e.g., utility line, pipeline), this table could summarize alternative routes evaluated during project planning. If the project is related to land development (e.g., residential or commercial development), this table could detail different parcels evaluated during the planning process.

Table 3a. Example Location Alternatives Summary Table: Transportation Project – New Alignment

Alternatives ǂ	Description	Proposed Alternative? (Y/N)	Summary of Aquatic Resource Impacts	Practicability Rationale Summary*
Alternative # 1	*Route A: Route highway through a mountain - Requires building a tunnel and blasting. No impacts to aquatic resources.*	*N*	*None*	*Construction cost (see analysis), unsuitable geology, hazardous construction.*
Alternative # 2	*Route B: Route highway along river. 45% forested, 25% Other wetlands, 30% meadow/herbaceous.*	*N*	*2.0 ac of Other wetland (PEM, FLn/FLg/SLtn),) 0.1 ac of floodway, 1.0 ac of floodplain impacts*	*Increased impacts to floodway, floodplain, and wetlands, increased forest clearing.*
Alternative # 3	*Route C: Route highway along edge of populated area. 65% urban, 5% EV wetlands, 20% forested, 10% meadow/open field.*	*Y*	*5,000 sf of floodway impacts, 0.5 ac of Other wetland impacts (PEM, SLtn/DFC/R2c)*	*Proposed alternative – avoids and minimizes impacts to aquatic resources to the extent practicable.*

ǂ Additional alternatives summary rows should be added as necessary.
* Examples of practicability rationale include but are not limited to: reduction in size, scope or density; existing technology; logistics; other locations; other designs; and items listed in 25 Pa. Code §§ 105.14(b) and 105.18a.

Table 3b. Example Location Alternatives Summary Table: Linear Utility Project

Alternatives ǂ	Description	Proposed Alternative? (Y/N)	Summary of Aquatic Resource Impacts	Practicability Rationale Summary*
Alternative # 1	*Alignment A: ROW primarily routed through undeveloped properties; 60% forested, 15% EV wetlands, 15% meadow/open field, 10% urban; located along floodway of HQ water*	*N*	*3.0 acres EV wetland impacts (PSS/PEM, R3c/FLn); 9,000 sf of floodway impacts*	*Property owner issues (multiple not willing to sell ROW), T&E spp. Concerns; increased impacts to wetlands, forested areas, and floodway.*
Alternative # 2	*Alignment B: ROW primarily co-located with existing utility; 15% forested, 10% Other wetlands, 75% meadow/open field (maintained ROW)*	*Y*	*1,000 sf of floodplain impacts, 0.3 ac Other wetland impacts (PEM/PSS, R3c/R2c)*	*Proposed alternative - avoids and minimizes impacts to aquatic resources to the extent practicable. All property owners willing to sell ROW*
Alternative # 3	*Alignment C: ROW primarily routed through agricultural fields; 80% agricultural field, 10% forested, 10% urban*	*N*	*None*	*Property owner issues (multiple not willing to sell ROW), prime farmland concerns.*

ǂ Additional alternatives summary rows should be added as necessary.
* Examples of practicability rationale include but are not limited to: reduction in size, scope or density; existing technology; logistics; other locations; other designs; and items listed in 25 Pa. Code §§ 105.14(b) and 105.18a.

Table 3c. Example Location Alternatives Summary Table: Land Development Project

Alternatives ǂ	Description	Proposed Alternative? (Y/N)	Summary of Aquatic Resource Impacts	Practicability Rationale Summary*
Alternative # 1	*Parcel A: Undeveloped property; 75% forested, 25% meadow; located within floodway of HQ water*	*N*	*500 LF of HQ stream impacts; 2,500 sf of floodway impacts*	*T&E spp. Concerns, increased impacts to forested areas and waterways.*
Alternative # 2	*Parcel B: Brownfield site remediated for PCBs; 70% open field, 5% (2.0 ac) Other wetlands, 25% asphalt*	*N*	*0.5 ac Other PEM wetland impacts*	*Increased impacts to wetlands.*
Alternative # 3	*Parcel C: 98% Old agricultural field, located within floodplain of trout natural reproduction water, 2% (0.5 ac) EV wetlands onsite*	*Y*	*1,000 sf of floodplain impacts, 500 sf of floodway impacts*	*Proposed alternative - avoids and minimizes impacts to aquatic resources to the extent practicable.*

ǂ Additional alternatives summary rows should be added as necessary.
* Examples of practicability rationale include but are not limited to: reduction in size, scope or density; existing technology; logistics; other locations; other designs; and items listed in 25 Pa. Code §§ 105.14(b) and 105.18a.

2. Design Avoidance and Minimization Alternatives Summary Table – A design avoidance and minimization alternatives summary table should include information regarding alternative onsite designs, routings, layouts, and engineering and construction techniques. For example, if the project is linear in nature (e.g., utility line or pipeline), this table could summarize the feasibility of crossing aquatic resources utilizing open-cut and trenchless technologies. If the project is transportation-related (e.g., bridge or culvert installation or replacement), this table could summarize the different structure types evaluated during the planning process. If the project is development-related, this table could summarize alternate layouts and reduction in size, slopes, construction technologies, etc. evaluated during the planning process.

Table 4a. Example Design Avoidance and Minimization Alternatives Summary Table: Transportation Project

Resource Information					**Alternatives ǂ**								
Resource					**Alternative #1**			**Alternative #2**			**Alternative #3**		
Unique Resource Identifier	Aquatic Resource Type	Waters Name	Chapter 93 / 105 Classification†	Resource Narrative Description	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary*	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary*	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary*
ST 023	*Perennial Stream*	*Adams Run*	*EV*	*pg. 13 EA*	*Bottom-less arch*			*20" Culvert*			*Bridge*		
					100 Square Feet	*No*	*pg. 3 Alt Analysis*	*110 Square Feet*	*Yes*	*pg. 3 Alt Analysis*	*60 Square Feet*	*No*	*pg 13 Alt Analysis*

ǂ Additional alternatives summary columns should be added as necessary

† Stream designated / existing use per Chapter 93, Wetland designation per Chapter 105

* Examples of practicability rationale include but are not limited to: reduction in size, scope or density; existing technology; logistics; other locations; other design, and items listed in 25 Pa. Code § 105.14(b) & 105.18a

Table 4b. Example Design Avoidance and Minimization Alternatives Summary Table: Linear Utility Project

Resource Information					**Alternatives ǂ**								
Resource					**Alternative #1**			**Alternative #2**			**Alternative #3**		
Unique Resource Identifier	Aquatic Resource Type	Waters Name	Chapter 93 / 105 Classification†	Resource Narrative Description	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary*	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary*	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary*
W-001	*Wetland*	*-*	*Other*	*pg. 27 EA (Topographic Slope/PFO/Oak-Mixed Hardwood Palustrine Forest)*	*Open-Cut Trench*			*Conventional Bore Trenchless Technology*			*Horizontal Directional Drilling Trenchless Technology*		
					250 Linear Feet	*Yes*	*pg. 3 Alt Analysis*	*25 Linear Feet*	*No*	*Unsuitable geology; Pg 3 Alt Analysis*	*25 Linear Feet*	*No*	*pg 5 Alt Analysis*

ǂ Additional alternatives summary columns should be added as necessary

† Stream designated / existing use per Chapter 93, Wetland designation per Chapter 105

* Examples of practicability rationale include but are not limited to: reduction in size, scope or density; existing technology; logistics; other locations; other design, and items listed in 25 Pa. Code § 105.14(b) & 105.18a

Table 4c. Example Design Avoidance and Minimization Alternatives Summary Table: Land Development Project

Resource Information					**Alternatives ǂ**								
Resource					**Alternative #1**			**Alternative #2**			**Alternative #3**		
Unique Resource Identifier	Aquatic Resource Type	Waters Name	Chapter 93 / 105 Classification†	Resource Narrative Description	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary*	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary*	Cumulative Resource Impact	Chosen Alternative?	Practicability Rationale Summary *
W-002	*Wetland*	*-*	*EV*	*pg. 35 EA (Riverine headwater Complex/PEM/ Mixed Forb-Graminoid Wet Meadow)*	*Configuration A*			*Configuration B*			*Configuration C*		
					0.35 ac.	*No*	*Increased impacts; pg. 4 Alt. Analysis*	*0.20 ac.*	*No*	*Increased impacts; pg. 7 Alt. Analysis*	*0.15 ac.*	*Yes*	*pg. 2 Alt. Analysis*

ǂ Additional alternatives summary columns should be added as necessary

† Stream designated / existing use per Chapter 93, Wetland designation per Chapter 105

* Examples of practicability rationale include but are not limited to: reduction in size, scope or density; existing technology;; logistics;; other locations; other design, and items listed in 25 Pa. Code § 105.14(b) & 105.18a

V. REFERENCES

25 Pa. Code Chapter 105. Dam Safety and Waterway Management www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter105/chap105toc.html

40 CFR Part 230 - Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material https://ecfr.io/Title-40/Part-230

DEP Agricultural Land Preservation Policy (012-0700-002). www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4624

DEP Comprehensive Environmental Assessment of Proposed Project Impacts for Chapter 105 Water Obstruction and Encroachment Permit Applications (310-2137-006) and Comment and Response Document. www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4679

DEP Environmental Assessment Form and Instructions (3150-PM-BWEW0017). www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4048

DEP Erosion and Sediment Pollution Control Manual (363-2134-008). www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4680

DEP Policy for Pennsylvania Natural Diversity Inventory (PNDI) Coordination During Permit Review and Evaluation (021-0200-001). www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=4637

EPA Memorandum: Appropriate Level of Analysis Required for Evaluating Compliance with the Section 404(b)(1) Guidelines Alternatives Requirements www.epa.gov/cwa-404/memorandum-appropriate-level-analysis-required-evaluating-compliance-section-404b1

EPA Memorandum: Individual Permit Flexibility for Small Landowners www.epa.gov/cwa-404/memorandum-individual-permit-flexibility-small-landowners

The Federal Wetland Permitting Program: Avoidance and Minimization Requirements, Environmental Law Institute, March 2008. www.eli.org/sites/default/files/eli-pubs/d18_03.pdf

Merriam-Webster.com Dictionary: Practicable, retrieved January 5, 2023, https://www.merriam-webster.com/dictionary/practicable

United States Army Corps of Engineers: Corps of Engineers Wetlands Delineation Manual. January 1987 - Final Report. https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/4532/

VI. APPENDICES

A. NEPA vs. Chapter 105 Alternatives Analyses

Due to similarities in commonly used terms for environmental analysis and permitting, it is necessary that this guidance document describe the differences between an alternatives analysis following NEPA requirements under federal law versus one following 25 Pa. Code Chapter 105 requirements. It is important to note that the Commonwealth's Dam Safety and Encroachments Act (DSEA) and the implementing regulations under Chapter 105 independently require an alternatives analysis which may be different than the Federal NEPA requirements under 40 CFR Chapter V Subchapter A. Therefore, a NEPA alternatives analysis may not completely satisfy the requirements of a Chapter 105 alternatives analysis.

In the context of NEPA, an Environmental Assessment (EA) can be defined as an exploratory report that is prepared for environmental clearance when the significance of impacts is not clearly known. For purposes of NEPA, an EA provides the analysis and documentation to determine whether an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI) should be prepared.

NEPA is a federal law enacted on January 1, 1970 (42 U.S.C. §§ 4321-4347). NEPA requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. The range of actions covered by NEPA is broad and includes making decisions on permit applications, adopting federal land management actions, and constructing highways and other publicly owned facilities. Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed actions. This evaluation includes looking at an equally broad alternatives analysis which goes beyond impacts to aquatic resources.
Source: www.epa.gov/nepa/what-national-environmental-policy-act

The NEPA process begins when a federal agency develops a proposal to take a major federal action or proposes to use federal funding. These actions are defined at 40 CFR Chapter V Subchapter A. The environmental review process under NEPA can involve three different levels of analysis, listed here from least to most complex: (1) Categorical Exclusion (CATEX) determination, (2) Environmental Assessment/Finding of No Significant Impact (EA/FONSI), and (3) Environmental Impact Statement (EIS).
Source: www.epa.gov/nepa/national-environmental-policy-act-review-process

In the context of Chapter 105, an alternatives analysis is a detailed analysis of alternatives to a proposed project that presents the potential impacts of a proposed project on the physical, chemical, and biological characteristics of the aquatic ecosystems and regulated waters of this Commonwealth in the project area.

In comparison to the NEPA process, the alternatives analysis process required under 25 Pa. Code Chapter 105 is narrower in scope and applies almost exclusively to dams, water obstructions, and encroachments focusing on impacts to aquatic resources. Further, under regulatory authority independent from NEPA, Chapter 105 has specific

requirements and considerations which must be met and evaluated, and these Chapter 105 requirements and considerations may not fully align with the NEPA process.

The definitions associated with the NEPA process, while similar to definitions in Chapter 105, differ in important ways from those found in Chapter 105, and the definitions associated with the NEPA process do not supersede or nullify those found in Chapter 105, which are Pennsylvania regulations promulgated under the DSEA, the Commonwealth's Clean Streams Law, and the Commonwealth's Flood Plain Management Act. Information from an alternatives analysis prepared to satisfy NEPA can be used to help satisfy certain aspects of an alternatives analysis for Chapter 105, but generally does not fully satisfy the Chapter 105 alternatives analysis criteria.

B. Data Resource List

This appendix provides a list of data resources that may be helpful in an applicant's investigation and analysis of project alternatives. This is not a complete list of available data resources. An incomplete investigation and analysis of information necessary for the adequate review of the project may impede the permit review process.

Formatting Key:

Bold, Black Underline - Name of Data Resource
Bold - Sub-category name of data resource
Blue underline - Hyperlink to data resource (if available)
(Parenthesis) / Black Underline / *Italics* - (General listing of available data) / Major data categories / *Sub-categories*

- **Municipality / Township and County Websites and Contact** (Aerials, Topography, Tax / Parcel, Plats, Easements, Deed information, Hydrology, Hydrogeology, Manmade features, Geologic, Soil, Site-specific impediments, Sewage service areas, private septic systems). Note: Municipalities have contact information for sewage utility to obtain sewage service areas. Local agency Sewage Enforcement Officers keep records of private septic systems, though older systems may lack any record.

- **United States Geological Survey (USGS)**

  - ❒ **Earth Explorer (EE)** - https://earthexplorer.usgs.gov/ (Aerials, LIDAR / DEMS, Historic human-made features, Historic and current land uses)

  - ❒ **Historical Topographic Map Explorer (HT)** - http://historicalmaps.arcgis.com/usgs/ (Historic topography, Historic manmade features, Historic and current land use)

  - ❒ **National Geologic Map Database (NGMDB) and Association of American State Geologist (AASG)** - https://ngmdb.usgs.gov/ngmdb/ngmdb_home.html (Geologic overview,

Strike and dip, Fractures and faults, Karst, Subsurface voids, Caves, Subsidence features)

- ❒ **Pennsylvania Water Science Center** - https://pa.water.usgs.gov/infodata/groundwater.php (Groundwater, Groundwater table, Well and spring locations)

- **National Water Quality Monitoring Council** - https://www.waterqualitydata.us/portal/ (Groundwater table, Well and spring locations, USGS well water supply sampling)

- **Unites States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)**

  - ❒ **Web Soil Survey** - https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm (Soil interfaces and unconsolidated material, Soil characteristics and properties)

- **U.S. Fish and Wildlife Service (USFWS)**

  - ❒ **USFWS** - https://www.fws.gov/gis/data/national/ (Critical habitat, Regional boundaries)

  - ❒ **National Wetland Inventory (NWI)** - https://www.fws.gov/wetlands/ (Wetlands)

- **Federal Emergency Management Act (FEMA)**

  - ❒ **National Flood Hazard Layer (NFHL)** - https://catalog.data.gov/dataset/national-flood-hazard-layer-nfhl (Floodway, Floodplain)

  - ❒ **NFHL Viewer** - https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd (Floodway, Floodplain)

- **Pennsylvania Spatial Data Access (PASDA)**

  - ❒ **Data Layer Access** - https://www.pasda.psu.edu/ (Aerials; LIDAR / DEM; Topography; County boundaries; Municipalities; Tax / Parcel information; Rivers; Streams; Wetlands: *Pennsylvania Geomorphon Landform Maps 2021, PSU DEP Topographic Wetness Index (TWI) 2020,FWS NWI Wetlands, Modeled Primary Wetlands Commonwealth of Pennsylvania Statewide 2013, Modeled Restorable Wetlands Commonwealth of Pennsylvania Statewide 2013, High-Resolution Land Cover, Commonwealth of Pennsylvania Statewide 2013*; Springs; Geologic overview; Soil interfaces). Note 1: PASDA does not include all County or Municipality or Tax/Parcel boundary data in Pennsylvania; if data is not listed on PASDA, check specific County or Municipality

website and/or contact. Note 2: Search DEP public records (see below) to obtain soil and groundwater contamination area delineations.

- ❒ **Pennsylvania Imagery Navigator (PSIEE)** - https://maps.psiee.psu.edu/ImageryNavigator/ (Aerial photographs, LiDAR contours, Topography)

- **Pennsylvania Conservation Explorer (a.k.a. PNDI)** – https://conservationexplorer.dcnr.pa.gov/ (Conservation planning, PNDI review, biological diversity, protected lands, etc.)

- **Pennsylvania Department of Conservation and Natural Resources (DCNR)** - https://www.dcnr.pa.gov/Pages/default.aspx or https://newdata-dcnr.opendata.arcgis.com

  - ❒ **Pennsylvania GEOlogic Data Exploration (PaGEODE)** - http://www.gis.dcnr.state.pa.us// or https://maps.dcnr.pa.gov/pageode/ (Topography, Groundwater, Groundwater table, Geologic overview, Geologic mapping, Strike and dip, Formation identification, Fractures/Faults, Subsurface voids, Karst, Caves, Subsidence features, Wells and springs)

  - ❒ **DCNR Open Data Portal** - http://data-dcnr.opendata.arcgis.com/ (Aerials, DEM / LIDAR, Groundwater, Groundwater table, Geologic overview, Geologic mapping, Formation identification, Fractures/Faults, Soil interfaces and geologic contacts, Subsurface voids, Karst, Caves, Subsidence features, Unconsolidated material)

  - ❒ **Pennsylvania Groundwater Information System (PAGWIS)** - https://www.dcnr.pa.gov/Conservation/Water/Groundwater/PAGroundwaterInformationSystem/Pages/default.aspx (Well and spring locations, Private well supply locations, Well construction, Groundwater table)

- **Department of Environmental Protection (DEP)** - https://www.dep.pa.gov/Pages/default.aspx and https://www.dep.pa.gov/DataandTools/Pages/GIS.aspx

  - ❒ **eMapPA** - http://www.depgis.state.pa.us/emappa/ (Web application for interactive mapping of: Complaints; Federal EPA sites; Regulated facilities and related information: *Air, Land reuse, Mining, Oil and gas, Radiation, Sample information system, Streams and water resources, Storage tanks, Waste, Water including public water service areas and public supply well listings;* Areas POI - geological; Areas POI - Environmental; Areas POI - General; Boundaries)

  - ❒ **DEP Environmental Site Assessment Search Tool** - https://www.depgis.state.pa.us/esaSearch/ (Web application for interactive mapping of: Air emissions, Known contamination, Surface and deep

mines, Known oil and gas wells, and related subcategories). Note: Data layers available for download on PASDA or DEP OPEN DATA.

- ❒ **DEP Activity and Use Limitations Registry (AUL)** - https://gis.dep.pa.gov/pa-aul/AulMap.html (Activity and use limitations: including not limited to Fencing, Groundwater use prohibition, Groundwater treatment, Health and safety plan, Leachate collection system, Maintenance of cap, Municipal ordinance, Non-residential use, Other engineering control, Other institutional control, Maintenance of point-of-entry treatment systems, Slab on grade construction, Slurry wall, Soil management, Stormwater management, Vapor barrier, Vapor mitigation, Vapor investigation, Groundwater use monitoring). Note: PA AUL provides direct links to AUL documents associated with a particular property (Document examples: Administrative Orders, EPA Consent Decrees, Consent Orders and Agreements, Deed restrictions, Environmental Covenants, Military master plans, Municipal ordinances, Post-remediation care plans)

- ❒ **DEP Open Data Portal** - https://newdata-padep-1.opendata.arcgis.com/ (Streams and lakes, water resources, oil and gas facilities, abandoned mine lands, air quality layers, waste layers, and more)

- **Pennsylvania Historical and Museum Commission (PHMC)** - http://www.phmc.state.pa.us/bah/dam/rg/di/r17-114CopiedSurveyBooks/r17-114MainInterfacePage.htm and https://www.phmc.pa.gov/PA-SHARE/Pages/default.aspx (Surveyed drawing - shows the name of the individual for whom the tract was surveyed, the acreage, the courses and distances and the names of adjoining property owners, and occasionally other significant geographical features of the landscape). Note: Not all parcels in Pennsylvania are included.

- **Pennsylvania Utility Commission (PUC)** - http://www.puc.state.pa.us/ (Existing utilities PA One Call and survey markings and/or contact PUC for data)

- **Pennsylvania Department of Transportation (PennDOT)**

  - ❒ **General Site** - https://www.penndot.gov/Pages/default.aspx (Municipalities, Tax/Parcel Information in PDF or contact for GIS or CAD layers)

  - ❒ **Open Portal for GIS data download** - https://data-pennshare.opendata.arcgis.com/ (Manmade features and cultural/architectural features)

  - ❒ **PennDOT online map viewer** - https://www.dot7.state.pa.us/onemap/

- **Delaware River Basin Commission (DRBC)**

  - **DRBC GIS** - https://www.state.nj.us/drbc/basin/map/GIS.html (Municipalities, Water resources, Geologic overview, Rivers, Streams, Wetlands)

  - **DRBC SE PA Ground Water Protected Area GIS** - https://www.state.nj.us/drbc/programs/project/gwpa-data.html (Municipalities, Water resources, Geologic overview, Rivers, Streams, Wetlands)

- **Susquehanna River Basin Commission (SRBC)**

  - **SRBC Map Viewer** - https://www.srbc.net/portals/susquehanna-atlas/projects-map/ (Municipalities, Water resources, Geologic overview, Rivers, Streams, Wetlands)

  - **SRBC Data Request** - https://services.srbc.net/request-data/ ($, surface water and groundwater withdrawals, consumptive use facilities, oil and gas) Note: PASDA has search tool and offers a subset of data layers for download for free.

- **United States Environmental Protection Agency (EPA)**

  - **Operating Procedure - Groundwater Sampling (3/6/2013)** - https://www.epa.gov/sites/production/files/2015-06/documents/Groundwater-Sampling.pdf

- **United States Office of Surface Mining Reclamation and Enforcement**

  - **Well Purging Procedures for Obtaining Valid Water Samples from Domestic and Monitoring Wells (5/21/2012)** - https://www.arcc.osmre.gov/about/techDisciplines/hydrology/docs/techGuidance/2012/tsd-wggb-Well_Purging.pdf