

Preparing An Alternatives Analysis Under Section 404 of the Clean Water Act

Fort Worth District – Regulatory Division

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In its evaluation of permit applications to discharge dredged or fill material into waters of the U.S. (WOUS), including wetlands, the U.S. Army Corps of Engineers (USACE) is required to analyze alternatives to the proposed project that achieve its purpose. USACE conducts this analysis pursuant to two main requirements – the 404(b)(1) Guidelines (Guidelines)¹ and the National Environmental Policy Act (NEPA)². USACE also considers alternatives as part of its public interest review evaluation³. This document is intended to assist permit applicants in formatting information into an “Alternatives Analysis” that includes the key items that must be evaluated for permit decisions. It is by no means all inclusive of the scenarios that can occur with an Alternatives Analysis but captures many of the most common topics.

USACE must evaluate alternatives that are practicable and reasonable. In accordance with the Guidelines at 40 CFR 230.10(a), a permit cannot be issued if a practicable alternative exists that would have less adverse impact on the aquatic ecosystem (known as the Least Environmentally Damaging Practicable Alternative [LEDPA]), provided that the LEDPA does not have other significant adverse environmental consequences to other natural ecosystem components. Reasonable alternatives must be considered to satisfy NEPA. However, there are no requirements with reasonable alternatives relative to USACE’s permit decision similar to the Guidelines. Evaluations to address the Guidelines and NEPA normally satisfy the requirements of the public interest review.

The Guidelines include two rebuttable presumptions for projects with discharges into WOTUS which involve special aquatic sites (defined at 40 CFR 240.40-45 and include wetlands, riffle pool complexes, and other specific aquatic resources), that do not require access to or siting within the special aquatic site(s) to achieve their basic essence (basic project purpose). The first presumption states that alternatives that do not affect special aquatic sites are presumed to be available. The second presumption states that practicable alternatives located in non-special aquatic sites (e.g., other waters, uplands, etc.) have less adverse impact on the aquatic ecosystem. **It is the applicant's responsibility to clearly demonstrate to the USACE that both of these presumptions have been rebutted in order to pass the alternatives portion of the Guidelines.**

¹ 40 CFR Part 230

² 33 CFR Part 325 Appendix B and 40 CFR 1508

³ 33 CFR 320.4(a)(2)ii

The amount and detail of information in an alternatives analysis and the level of scrutiny required by the Guidelines is commensurate with the severity of the environmental impact (as determined by the functions of the aquatic resource and the nature of the proposed activity) and the scope/cost of the project⁴. Analysis of projects proposing greater adverse environmental effects need to be more detailed and explore a wider range of alternatives than projects proposing lesser effects.

The extent to which an alternatives analysis incorporates these principles and details, can have substantial effects on the amount of time necessary for the USACE to evaluate a permit application. Below are r e c o m m e n d e d steps to follow in providing the necessary information for the USACE to consider in an alternatives analysis:

Step 1: Describe Need and Define Purpose

Need and purpose are inter-dependent terms which are critical to the alternative analysis. They should be articulated individually since the project's purpose is framed in relation to addressing a need.

Need is typically the problem or opportunity that the applicant is proposing to meet with their project. It can normally be quantified or measured. Information collected or developed relative to project need is important in the framing of the project purpose. The evaluation of need will vary based on the type of project and will be commensurate with the magnitude of impacts and scope of the proposal. Examples can include:

- Road/highway project – safety issues/needs such as accident rates, congestion levels, regional traffic flow, level of service, etc.
- Commercial/Housing Development – market demands
- Energy project – projected increases in power use

USACE normally does not require an assessment and documentation associated with economic evaluations for private enterprise and assumes the applicant has undertaken adequate analysis. However, USACE may require documentation and assessment of the need on a case by case basis.⁵ USACE can also conclude a project is speculative in relation to the need assessment and make a negative finding concerning a permit application.

Based upon the need, the applicant should develop their project purpose and clearly state it. The project purpose statement should be carefully considered and developed, as it will define and drive the complexity of the alternatives analysis, including constraints and practicability considerations. The purpose should not be defined in such a restrictive manner to unduly restrict or preclude other alternatives, nor should it be so broad that a reasonable search of options cannot be accomplished. The applicant is to define the project purpose from their perspective. Inclusion of a geographic limit within the purpose statement is normally justified but subject to the same limits relative to unduly restricting the range of alternatives. This does not mean that site-specific projects do not occur. Additionally, USACE must develop its own project purpose

⁴ August 23, 1993 EPA/USACE Memorandum to the Field concerning the Appropriate Level of Analysis Required for Evaluating Compliance with the Section 404(b)(1) Guideline Alternatives Requirements

⁵ 33 CFR 3204(q)

statement while considering the applicant's as well as the public's perspective. While at times, projects may legitimately be multi-use in nature, statements that are multi-purpose add substantial complexity to the alternatives analysis and can exponentially increase the number of alternatives that will need to be evaluated to capture the full range of practicable alternatives. Below are two examples of defining project purpose:

Example 1

- *To build a profitable 225-lot single-family residential development with 2 Olympic-sized swimming pools, 3 recreational centers and 5 sports fields at the southwest intersection of Interstate 35W and Keller-Hicks Road.*

This example is too restrictive because there are no alternative sites to consider. It also unnecessarily details the exact number of lots and pools and other facilities, which unduly reduces the number of practicable and reasonable alternatives. Additionally, the profitability of the project is an inherent aspect of the project but not necessarily germane to the analysis USACE has to undertake.

- *To provide residential development in Northeast Texas.*

For the type of action being proposed, this example is too broad in scope if the applicant is focusing on a certain city or county to locate the project. This would also create such a large number of alternatives that evaluating them would be unwieldy.

- *To provide a medium-sized single-family residential development with associated support facilities near Interstate 35W in Fort Worth, Texas, to meet local demand.*

This is an appropriate overall project purpose. It clearly defines what the project involves, single-family residences, rather than "housing" which could include multi-family features such as townhouses or apartments, reflects the need to be located near a targeted major transportation corridor (which would need to be explained and supported in the needs analysis), and it defines the geographic scope to a reasonable and justified size addressing the applicant's target area of Fort Worth, TX while reflecting the public demand.

Example 2

- *To build an economically viable 1.75-million square foot furniture warehouse facility with a 150-car parking lot and 2-acre aesthetic reflecting pond, at the Southeast corner side of I-20 in Duncanville.*

As with the first example, this example is too restrictive because there are no alternative sites to consider. It also unnecessarily details the exact square footage of the building, the number of parking spaces, and includes a water feature. It is unclear why the proposed water feature would be an essential component of this project. An applicant would have to attempt to justify in the need analysis why such a feature is relevant and needed for the commercial project. Additionally, as with the first example,

the economic viability of the project is an inherent aspect of the project but not necessarily germane to the analysis USACE has to undertake.

- *To provide light industrial/commercial development in the North Central Texas.*

Although the applicant may have a legitimate need to locate the project in a certain region, this example is likely too broad in scope and would also create such a large number of alternatives that evaluating them would be unwieldy.

- *To provide large commercial warehouse space with access to Interstate Highway and rail line in the South Dallas area to meet regional demands.*

This is an appropriate overall project purpose. It clearly defines what the project involves, commercial warehouse space, rather than the broader scope of light industrial/commercial development. The statement also specifies a legitimate need for access to both Interstate Highway and rail for transportation of goods and targets a reasonable and justifiable geographic target area of South Dallas county. The needs analysis that supports this statement will provide further details on the building size, the need for warehouse space in this growing area and will describe the specific transportation needs that drive project constraints relative to siting near both Interstate Highway and rail line to serve regional demands.

The applicant's proposed overall project purpose will be carefully considered, but if the USACE cannot concur with it as submitted, the USACE is required to modify it. If the applicant has submitted an alternative analysis using a project purpose the USACE cannot concur with, (e.g., it is too restrictive, contains multiple purposes but treated as one, etc.), the analysis most likely will need to be revised to appropriately include the proper range of practicable and reasonable alternatives and/or revised alternatives screening. The applicant would be notified of the change to the definition.

Additional information about the proposed overall project purpose and applicant desires may also be provided, including details about the area, location, history, and other factors that influence or constrain the intended nature, size, level of quality, price class, or other characteristics of the project. Information that further describes why particular geographic boundaries were chosen also will assist the USACE in its review.

Step 2: Identify Alternatives

The applicant should list all alternatives that were initially considered (the "universe" of options) that could meet the overall project purpose. A brief description of each alternative should also be included. The maximum number of alternatives to study will vary and depends on the nature and scope of the proposed project. The number evaluated should typically be greater for projects involving greater impacts. The list, at a minimum, should be broken into the categories noted below:

- According to 33 CFR Part 320.1(a)(4) and 325 Appendix B, the USACE is neither an

opponent nor a proponent of the applicant's proposal; therefore, the applicant's final proposal will be identified as the applicant's preferred alternative

- The No Action Alternative(s) – this includes an alternative that would involve no discharges of dredged or fill material into WOUS (not involve a discharge of dredged or fill material into WOUS, which could involve reconfiguring the project to avoid all wetlands on the site or siting the project entirely in uplands offsite) or permit denial. It can also include alternatives that are beyond the control of the applicant. Although the No Action alternative might not seem reasonable initially, it must always be included in the analysis and can serve several purposes. It is a reasonable alternative, especially for situations where the project does not comply with the regulations and consideration and disclosure of the consequences of a permit denial is warranted. It may also be a reasonable alternative for situations where impacts are great and the need is relatively minor. It can also be used in some circumstances as a benchmark – usually for ongoing actions - enabling decision makers to compare the magnitude of the environmental effects of the action alternatives.
- Offsite locations, including those that might involve less adverse impact to WOUS, or less impact to special aquatic sites or less impact to higher quality aquatic resources.
- Onsite alternatives, particularly those that would involve less adverse impact to WOUS. These include modifications to the alignments, site layouts, or design options in the physical layout and operation of the project to reduce the amount of impacts to WOUS. On-site options can be identified as sub-options.

Step 3: Describe and Analyze Alternatives for Practicability

(NOTE: It may be more efficient to demonstrate that some alternatives will have greater impact on the aquatic ecosystem compared to the applicant's preferred option than determining their practicability. If it can be easily documented, and clearly described within the narrative and matrix described below, then step 4 can be included in step 3. This is only appropriate for alternatives where this distinction is clear.)

There may be differing levels of alternatives screening that occur with permit applications. Some applications may require several levels of screening (larger impacting and more complex proposals including multi-purpose projects) while others may have a single level (normal individual permit actions). For multiple level screening scenarios, coarser screens are typically applied at the outset to eliminate clearly impracticable and unreasonable alternatives while the sophistication and refinement of screens increases as the range/list of alternatives narrows. Single level alternatives analyses will normally not include coarse level screens but will have comparable degree screens for all alternatives. Regardless of the type of alternatives analysis, the criteria used to establish screens and how an alternative passes or fails the screen need to be clearly elucidated and supported.

It is important to note that while the terms practicable and reasonable are used and may be synonymous at times, the factors to determine practicability for the Guidelines and reasonability

for NEPA can and typically do differ. Practicable is defined as meaning the alternative is available, and capable of being done after taking into consideration cost, existing technology, and/or logistics in light of the overall project purpose(s).⁶ Reasonable is based on consideration of the project purpose as well as technology, economics and common sense.⁷ The Guidelines may require more substantive effort to demonstrate compliance compared to NEPA,⁸ as well as involve limitations relative to how they can be applied to determine practicability. This is further underscored by the rebuttable presumptions previously discussed requiring it be clearly demonstrated by the applicant that the alternatives are not practicable (and not less damaging – see step 4) compared to the applicant’s proposed project.

When preparing an alternative analysis, there are potential opportunities to reduce effort and time as noted above relative to impacts to the aquatic ecosystem. This can also occur with alternatives that are not available or obviously impracticable. Such options can be identified and evaluated first and eliminated based on limited screening efforts. For example, attempts to obtain alternate sites but were not available or turned down for purchase, lease, or management can normally be eliminated from further consideration with limited information. Sites that are obviously too small to accommodate the project or that lie substantially outside the geographic boundaries identified in the overall project purpose are not practicable, and therefore unreasonable, and can be eliminated with little information. Any alternatives that are eliminated from further study because the applicant concluded they failed this first coarse round of screening still require certain descriptive information be provided. However, the level of information should be less than other options that will be subjected to more refined screen efforts. It is imperative the applicant describes why any alternative is eliminated from further analysis so USACE can independently review and verify the information and each step in the applicant’s alternative analysis. The USACE will verify that the criteria used for screening at all levels are objective and comply with regulations, policy, and implementing guidance and ensure they are not so restrictive that they eliminate practicable, which includes reasonable, alternatives.

Alternatives should be clearly listed and numbered for ease of reference and comparison. *At a minimum*, the following information for each alternative site examined should be provided:

1. *General site information:*

- a. specific parcel information including, but not limited to; parcel ID numbers, aerial photos, location maps, and GPS coordinates;
- b. presence, quantity and quality or function of wetlands and/or other WOUS (If demonstrating that a site has more impact than other options, including the applicant’s preferred, include potential direct and indirect impacts associated with these improvements in lieu of practicability information);
- c. County/City zoning designation;
- d*. the presence of any federally-listed threatened or endangered species or their critical

⁶ 40 CFR 230.3(q)

⁷ Council on Environmental Quality Guidance 40 Most Asked Questions #2A

⁸ 40 CFR 230.10(a)(4)

habitat, state listed species, or other natural or regionally important ecosystem resource factors that may be significantly impacted; and,

e*. site infrastructure and other components for a single and complete project (will the site require new access roads/infrastructure, etc.?).

(* - Items d and e may not be needed for those alternatives eliminated in the earliest coarse screens.)

2. *The practicability of each alternative:*

a. **Practicability:** As previously stated, alternatives that are practicable are those that are available and capable of being done by the applicant after considering the following (in light of the project purpose). **An alternative needs to fail only one practicability factor to be eliminated during the screening process:**

- **Costs** - Cost is analyzed in the context of the overall scope/cost of the project and whether it is unreasonably expensive. This determination is typically made in relation to comparable costs for similar actions in the region or analogous markets⁹. If costs of an alternative are clearly exorbitant compared to those similar actions, and possibly the applicant's proposed action, they can be eliminated without the need to establish a cost threshold for practicability determinations. Cost is to be based on an objective, industry-neutral inquiry that does not consider an individual applicant's financial standing. The data used for any cost must be current with respect to the time of the alternatives analysis. For example, the costs associated with various infrastructure components such as roadways or utilities, including upgrades to existing infrastructure components or the need to establish new infrastructure components, may affect the viability of a particular alternative. A location far from all existing infrastructure (roads, water, sewer, and/or electricity) might not be practicable based on the costs associated with upgrading/establishing the infrastructure necessary to use that site. However, just because one alternative costs more than another does not mean that the more expensive alternative is impracticable. It is important to note that in the context of this definition, cost does not include economics. Economic considerations, such as job loss or creation, effects to the local tax base, or other effects a project is anticipated to have on the local economy are not part of the cost analysis;
- **Existing Technology** - The alternatives examined should consider the limitations of existing technology yet incorporate the most efficient/least-impacting construction methods currently available. For example, alternatives to a proposed highway that occur in unstable or dynamic soils may not be practicable due to a lack of technology to ensure the road will not crumble or collapse. Implementation of state of the art technologies might be available and should be considered if applicable. Engineered retaining walls and cantilevered road ways can also be incorporated into an alternative that substantially minimizes wetland or water

⁹ National Policy Guidance Old Cutler Bay Associates 404(q) Permit Elevation, 13 Sep 1990.

impacts by eliminating fill slopes. However, it is recognized that such actions may result in the alternative being determined as impracticable due to costs; and,

- Logistics - The alternatives evaluated may incorporate an examination of various logistics associated with the project, i.e., placement of facilities within a specified distance to major thoroughfares, utilization of existing storage or staging areas, and/or safety concerns that cannot be overcome. Examples of alternatives that may not be practicable considering logistics are: no access to a major interstate or rail for manufactured goods; a piece of property is land-locked and cannot be accessed by public roads or utilities and applicant does not have condemnation authority; water supply is needed within a certain time frame and option cannot be implemented within it.

b. Availability: The Guidelines state that if it is otherwise a practicable alternative, an area not presently owned by the applicant that could reasonably be obtained, utilized, expanded, or managed in order to fulfill the overall purpose of the proposed activity can still be considered a practicable alternative. In other words, the fact that an applicant does not own an alternative parcel, does not preclude that parcel from being considered as a practicable alternative. This factor is normally a consideration as a logistics and possibly cost limitation. **The applicant should consider and anticipate alternatives available during the timeframe that the USACE conducts its alternatives analysis. In some circumstances, consideration of the timeframe when property was obtained by the applicant may influence the analysis.**

3. Presentation of alternatives information:

An alternatives comparison matrix (see example on next page) is an effective way to present and compare the main parameters that were considered during the evaluation. To allow for an objective evaluation, the comparison of the plan(s) for the proposed and alternative sites should be framed for “yes” or “no” determinations. A narrative needs to accompany the matrix defining the practicability factors chosen, the data used to support the limitations of the factor or criteria, and explanation of any “no” determinations. Practicability of the No Action alternative also must be addressed in this narrative and, if applicable, also included in the matrix. The information should explain the consequences on the applicant and the public if the project is denied, if an alternative can be implemented that does not involve discharges into WOUS, or is an option that is outside the capability of the applicant. Any remaining alternatives that are found to be practicable will move on to the next and final step.

Example Alternative Comparison Matrix for Practicability

Practicability Category	Factor	Alternative 1 Applicant's Preferred	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Available	Available for Acquisition	YES Applicant owns the parcel	YES Listed in multi-list	YES Listed in multi-list	NO Applicant does not have condemnation authority	YES Listed in multi-list	YES Listed in multi-list
Logistics	Sufficient Parcel Size	YES 800 acres	YES 870 acres	YES 770 acres	N/A – failed availability screen	YES 900 acres	NO 600 – did not provide adequate space for size range of project
	Existing Zoning Appropriate & Potential for Zoning Change	YES Zoned for this project type	YES Zoned for this project type	YES Zoned for agriculture, City has not denied zone change	N/A	YES Zoned for this project type	N/A – failed sufficient parcel size screen
	Availability of Utilities	YES Adjacent to site	YES 0.5 miles to existing water, sewer and power.	YES Adjacent to site	N/A	YES 6 miles to existing water, sewer and power	N/A
	Availability for Access	YES County ROW on east property boundary	YES County ROW to northwest property corner	NO Landlocked by private parcels, request for easement denied, applicant does not have condemnation authority	N/A	YES County ROW to northwest property corner	N/A
Existing Technology	Topography and other Site Conditions Feasible for Construction of Project	YES	YES With use of engineered retaining walls and drainage systems	N/A – failed access screen	N/A	YES With use of engineered retaining walls, drainage systems and bridges	N/A
Cost (No cost threshold established)	Reasonable Acquisition Costs (non-exorbitant)	YES Applicant owns the parcel	YES Within market normal costs for similar properties	N/A	N/A	NO Exorbitant - costs are 10X normal costs for similar land	N/A

Step 4: Identify the Least Environmentally Damaging Alternative

All alternatives making it to this step are practicable. Therefore, a comparison and determination of which is the least damaging is required. The Guidelines require that only the LEDPA can be authorized. It is also important to recognize that determining the least environmental damaging alternative cannot include any aspect of compensatory mitigation.¹⁰

Using the same numbering system from the step above, identify the impacts to the aquatic ecosystem for each remaining practicable alternate site and option. Because the Guidelines include the consideration as to whether the LEDPA results in “other significant adverse environmental consequences” to other natural ecosystem components, those other natural environmental factors and the significant effects to them can also be discussed as well. For each remaining site, the narrative should include the following information:

- a. describe the direct, indirect, and cumulative impacts (beneficial or adverse) to the aquatic ecosystem (WOUS) associated with each of the remaining alternatives;
 - b. identify, specify and quantify the impacts to the aquatic ecosystem. Rather than stating that "Alternative A would result in a large impact to low quality wetlands and ditches that are sparsely vegetated and impact some wildlife" use "Alternative A would result in the discharge of fill material into 2.1 acres of modified riverine wet meadow wetland and realignment and filling of 1.2 acres of channelized intermittent stream that contains scattered emergent wetland vegetation."
 - c. describe the **significant** adverse environmental impacts associated with each of the remaining alternatives on other natural ecosystem features and how the determination of significant was made.
 - d. in order to ensure an appropriate and meaningful comparison of alternatives in relation to their proposed and predicted impacts, equivalent methods and level of detail are required for all alternatives¹¹ at similar levels in the screening process. For example, if detailed studies on hydrologic effects are presented for one the alternatives carried forward in an analysis, but not others, the analysis would to be supplemented with the same type and level of data and information for the other options.
2. If multiple practicable alternatives remain, and/or many natural environmental factors are involved that would be significantly impacted, another matrix that contains only environmental parameters (e.g., wetland functional units; Federal and/or state listed species; high functioning/value upland habitat, floodplains, and plant communities; air quality) can be used to assist in illustrating the proposed LEDPA. Emphasis should be placed on impacts to the aquatic environment through acreage and functional unit loss of wetlands or other WOTUS that would be affected or eliminated by each alternative. An example matrix is below.

¹⁰ 40 CFR 230.5 and February 6, 1990 Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines

¹¹ 40 CFR 1502.14 and CEQ's 40 Most Asked Questions 5b

Example Environmental Factor Matrix

Environmental Factors	Alternative 1	Alternative 2
	Applicant's Preferred Alternative	
Wetland Impacts (Acres)	2.0	6.0
TXRAM Units	11.4	31.9
Open Water Impacts (Acres)	5.0	2.0
Impacts to Federally Listed T & E Upland Species	Yes – not a significant loss	No
Floodplain Upland Impacts (Acres)	0.0	5 acres - not a significant loss
LEDPA	Yes	No

Step 5: Determination of LEDPA

Conclude the alternatives analysis with a description of the alternative proposed to be the LEDPA, reiterating the rationale for this determination. It is noted that if the remaining alternatives have similar impacts to the aquatic ecosystem as the applicant's preferred, USACE can conclude the applicant's proposal is the LEDPA.¹² It is reiterated that no aspect of compensatory mitigation can be utilized in making this determination. In other words, an applicant cannot use compensatory mitigation to "buy down" an alternative in order to meet the LEDPA.

¹² August 23, 1993 EPA/USACE Memorandum to the Field concerning the Appropriate Level of Analysis Required for Evaluating Compliance with the Section 404(b)(1) Guideline Alternatives Requirements