



**Pacific Side Excavation and Dredging
Material Disposal Alternatives
Evaluation**

**Evaluación de las Alternativas de
Disposición de Material de
Excavación y Dragado del Lado
Pacífico**

Moffatt & Nichol Engineers

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Resumen y Conclusiones

11 SUMMARY & CONCLUSIONS

11.1 General Findings

As noted early in this report, it is important to classify and evaluate each of the disposal sites based on the source of material. The following discussion highlights the key points related to each group of sites, and presents some general recommendations for prioritization.

11.1.1 Gaillard Cut Sites

None of the Gaillard Cut candidate sites present any serious obstacles from environmental or cost standpoints, with the exception of sites T3 (Gaillard Cut North) T5 (Gaillard Cut south) and T6 (UXO area), all of which are within the UXO designated areas.

However, there is ample capacity in sites T1, T2 and T4 to meet the requirements of the project and the following terrestrial sites are appropriate for immediate use as disposal locations for Gaillard Cut material.

- T1 (Rio Mandinga) (Modified Delineation)
- T2 (Rio Camacho) (Modified Delineation)
- T4 (Gaillard Cut East)
- In the event that fill material is required for the Trinidad Dam project, the Gaillard Cut material represents the most cost effective source, although the transportation cost will be approximately \$1.00 per m³ higher than deposition at the sites listed above.

11.1.2 Third Locks Sites

Sites T7 (Miraflores West Bank) and T8 (1939 Locks Excavations) are closest to the excavation site and present no obstacles to immediate use to receive fill material. However the combined capacity is limited to some 9.50 million m³ and dependent on the final alignment of the Locks and plans for the use of the area surrounding the new construction. Based on these limitations, it is recommended that these two sites fall under the jurisdiction of the group charged with the final planning and design of the Locks and supporting areas.

Site T6 (UXO area) represents an important potential site to receive material from the Locks project since it offers the capacity to receive the entire fill, with few environmental

problems. Transportation costs are very economic, but the key issue is the resolution of the UXO problem.

As a minimum, ground surveys and risk assessments are required, but it would appear logical that the placement of up to 30 m of fill over the UXO area should resolve the issue for once and for all.

In the event that the risk assessment indicates that it is not necessary to undertake extensive recovery and clearance of the unexploded materials, the development and restoration costs of this site will be significantly reduced.

A major disadvantage of the UXO site is that the resolution of the UXO issues and placement of fill at this location adds no value to the site, unless ACP were to reverse its policy on development within the Panama Canal area of control. This is an unlikely expectation.

Sites that are not considered suitable as disposal options are **T9 (Rodman/Horoko)**, due to environmental concerns & capacity limitations and site **T10 (El Arado)** due to cost and institutional issues. In particular, the El Arado site is in private ownership and should only be considered for disposal in the event that all other possibilities have been exhausted.

Site M1 (Panama Bay Fill) is an exciting option but most unlikely to take place without years of discussion, planning and the expenditure of significant amounts on sewage line diversion and other water quality related projects. Given this uncertainty and the potential high cost of movement of material to the site, it is recommended that it not be given a high priority as a disposal site for this project.

Sites M2 (Chorrillo Bay) and M3 (Amador East) are excellent candidates to receive material but the cost of transport from the Locks excavation is higher than for the Pacific entrance dredging project and it is recommended that they be designated as potential sites for this latter source.

Site M4 (Farfan – Palo Seco) is likely to be controversial since there may be impacts of development on the land side areas adjacent to the fill. At the same time, any extension of the headland parallel to Amador will block the view from the Causeway and is likely to be unpopular with the public and also with the investors in the Causeway projects.

However, limited fill at this location could provide the basis for additional container terminals or a mixed use residential-commercial type of development, in conjunction with one of the other disposal sites.

Site M5 – (the artificial island) is the only one marine site that offers the potential to receive all of the excavated material from the Locks Project. However, the impact of development of a port complex on the island may not be favorably accepted by the neighboring communities and public at large.

The mixed use development option is likely to meet with less resistance and has the advantage that it can be designed to dispel many of the objections to the less flexible port option.

The costs of transportation of materials to the island are relatively close to the costs of development and transport to the UXO areas, although additional study of the UXO site is needed to confirm the site preparation costs.

11.1.3 Pacific Entrance Channel Dredging

The favored site for receipt of material from this project is **M3 (Amador East)**, closely followed by **M2 (Chorrillo Bay)**. Transport costs to both are similar and very low, and there are likely to be few objections to filling the area east of the Causeway to improve traffic flows and add recreational features to this attractive location. However, relocation of the Smithsonian Pier and access would be required, and it is not clear which entity would take responsibility for the cost of this work. Approvals for filling Chorrillo Bay will be more difficult and there are socio economic issues associated with this project.

11.2 Summary of Recommendations

In summary, there are few difficulties associated with the allocation of terrestrial sites T1, T2 and T4 for receipt of materials from the Gaillard Cut project. They have ample capacity to meet the projected volume of material and pose no significant environmental challenges. For the Gaillard cut work, sites T3, T5 and T6 are less cost effective and not required to meet the expected volume of materials to be excavated or dredged.

Amador Causeway East (M3) is the preferred candidate for material from the Pacific entrance dredging, although placement of the full volume of some 14 million m³ would require expansion of the Causeway by 500 m, that may be seen as excessive. In the event that filling can be approved for the Chorrillo Bay site, (M2), this then resolves this issue.

The key issue related to this study is the selection of one or more sites to receive some 90 million m³ of material from the Third Locks Project. If the El Arado site is discounted for the reasons noted earlier, only the UXO area (site T6) and the artificial island (Site M5) remain as sites that could receive all of the fill material. The combined capacity of all of the other acceptable sites does not meet the project needs. Hence the basic choice comes down to the selection of one of these two options,

Unfortunately there are a number of serious issues to be resolved at both locations. The resolution of the UXO issue at Site T6 requires approvals from high level government

and the development of the site provides no added value for the investment in UXO clearance and site restoration.

On the other hand, recent waterfront fill projects in Panamá have been surprisingly controversial and it is difficult to gage the public reaction to the construction of a new island north of Taboga. The presentation of the four development alternatives introduced in this report may go a long way to gaining public support of this project, but it is still relatively unknown territory at this time.

Based on these conclusions and concerns, it is recommended that detailed studies should now be commenced to resolve as many of the identified issues related to the UXO site and the artificial island project as soon as possible. In this way, ACP can assess the reaction to both projects while getting a better understanding of the cost and time implications of each option.

With all of the required information and approvals in hand, a decision can then be made on the preferred site or sites, based on value added or cost considerations.