

***Feasibility study for maritime civil works and survey scope of work to design the Capbreton canyon crossing by HDD.***



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## 12. Conclusions

- In terms of geology, a weak rock, of sandstone, clays, sedimentary formation will be drilled, permitting a fast and successful drilling.
- According marine dynamics, an available window of about [REDACTED] could be planned. A specific study and local information must be obtained with direct information. The expected save elevation will be 15m over SWL.
- Marine resources described in this report are available at this moment, however, timeline gap must be planned to be able to lock this resources or locate alternatives for the right marine windows.
- Two crossing options are suggested to develop. This options A and B must be surveyed to be able to determine the most feasible. After survey investigation, and according all the information, que crossings could be modified to improve the design.
- Three HDD operation works to execute the crossings are developed. Mainly:
  - HDD Process 1: minimizes Marine & HDD resources, to be able to execute small boreholes up to 8 5/8" pipes.
  - HDD Process 2: Allows install bigger pipes than Process 1, and steel pipes if are requested. In the other hand, mud and cuttings spill in the exit side are out of control, and diving operations will be required.
  - HDD Process 3: Allows install all HDPE configurations. It not be feasible to install Steel pipes. Minimizes environmental impact and reduces diving operations.
- Cross section of multiple options is developed in this report. Small pipes and multiple parallel HDD are suggested to fulfill the project in the scheduled marine timeline window however bigger pipes could be installed.
- A decision matrix, concerning HDD operations and cross sections shows multiple alternatives to execute the crossing. In this decision matrix is indicated the expected HDD drilling time. According this time, only the option Minimal and Minimal b can be executed in one marine window. All the other options, need to be executed in two marine windows.
- According to improve cable transitions, once installed the pipes in the HDD, the transition will be dredged to reduce the inclination of the pipes (when casings are installed).

Finally, the project described above it's feasible according the current information, awaiting more information to be collected on the site, following the guidelines described in scope of survey, to be able to develop constructive designs.

### Technical assessment resume:

Concerning all the options developed in the report, two main solutions are suggested:

#### Individual pipe in each borehole

Minimal A	6 HDD (8 5/8" steel pipe)	Process 1	Cable gap: 1.5	[REDACTED] M€
Option 12b	6 HDD (280 HDPE RC PN25)	Process 3	Cable gap: 1.5	[REDACTED] M€
Option 11	6 HDD (355 HDPE RC PN25)	Process 3	Cable gap: 2.0	[REDACTED] 5M€

#### Multiple pipes in the same borehole

Option 14	2 HDD (900 HDPE RC PN 12.5 with (3 x 315 PN20 HDPE RC)	Process 3	Cable Gap: 2.0	[REDACTED] 7M€
Option 15	2 HDD (3x355 PN25 HDPE RC)	Process 3	Cable Gap 2	[REDACTED] 0M€
Option 4	2 HDD (3x250 PN16 HDPE RC)	Process 2	Cable Gap 1.5	[REDACTED] 7M€.

Concerning HDD technical and economical criteria's, if the gap can be fixed at 1.5, the most feasible solution is Minimal A.