HYDROGRAPHIC SURVEYS LTD.

Hydrographic Surveys Ltd.
The Cobbles,
Crosshaven,
Co. Cork.

7th May 2019

Capt. Martin Donnelly,
Drogheda Port Company,
Harbourville,
Mornington Road,
Drogheda,
Co Meath.

Dear Capt. Donnelly,

We refer to the survey conducted on your behalf in November 2006. The survey involved drogue releases at flood and ebb periods of a tidal cycle on 22nd November 2006, a day with tidal levels just below mean spring range.

We have reviewed the survey report and would like to state that the results of this survey are still valid due to the fact that no significant change is coastline has occurred and the tidal regime is likely unchanged as a result.

Yours sincerely,

J.B. Jenkins

Managing Director

Survey Report

On

Drogue Releases

At

Drogheda Offshore Dump Site

22nd November 2006

Prepared For:

Drogheda Port Company
Maritime House
The Mall
Drogheda
Co. Louth

Prepared By:

Hydrographic Surveys Ltd
The Cobbles
Crosshaven
Co. Cork

Contents

1. Requirements

The requirements for the survey were defined in the Monitoring Strategy Document prepared by Malone O'Regan, Consulting Engineers, which supported the Foreshore Licence and Dumping at Sea Permit Application dated September 2006.

More specifically paragraph 4.0 headed **Monitoring at Dump Site.** This states the following:

"The primary objective of monitoring at the dump site is to establish if any material released at the dump site is brought back ashore. Therefore, it is proposed to carry out the following:

- *The current regime will be established using tracking drogues. This can take place just prior to or during an actual dumping event.*
- *Tracking drogues will be released at spring tide at surface, mid and bottom depths.*
- *The drogue will be tracked until the tide turns.*
- *A report will be prepared detailing findings of the tracking programme and in particular will determine if currents are likely to bring sediment ashore.*
- *The monitoring programme and report will be carried out and prepared by suitably qualified person(s).*

It has been suggested that tracking should be done during easterly winds however easterly winds represent an operational constraint and dumping will be suspended due to strong winds and sea conditions."

2. Drogues

The drogues used in this study are designed so as to enable them to be deployed at whatever depth they are specified to be set to, in this case, surface, mid and bottom depths, surface is taken as 1m below surface to minimise any surface wind effect and bottom taken as 1-2m above the seabed.

The drogue is constructed as in figure 1 with a light line connecting it to a surface float, it is this float that is tracked for position, each float has a short thin narrow pole with flag attached for identification purposes.

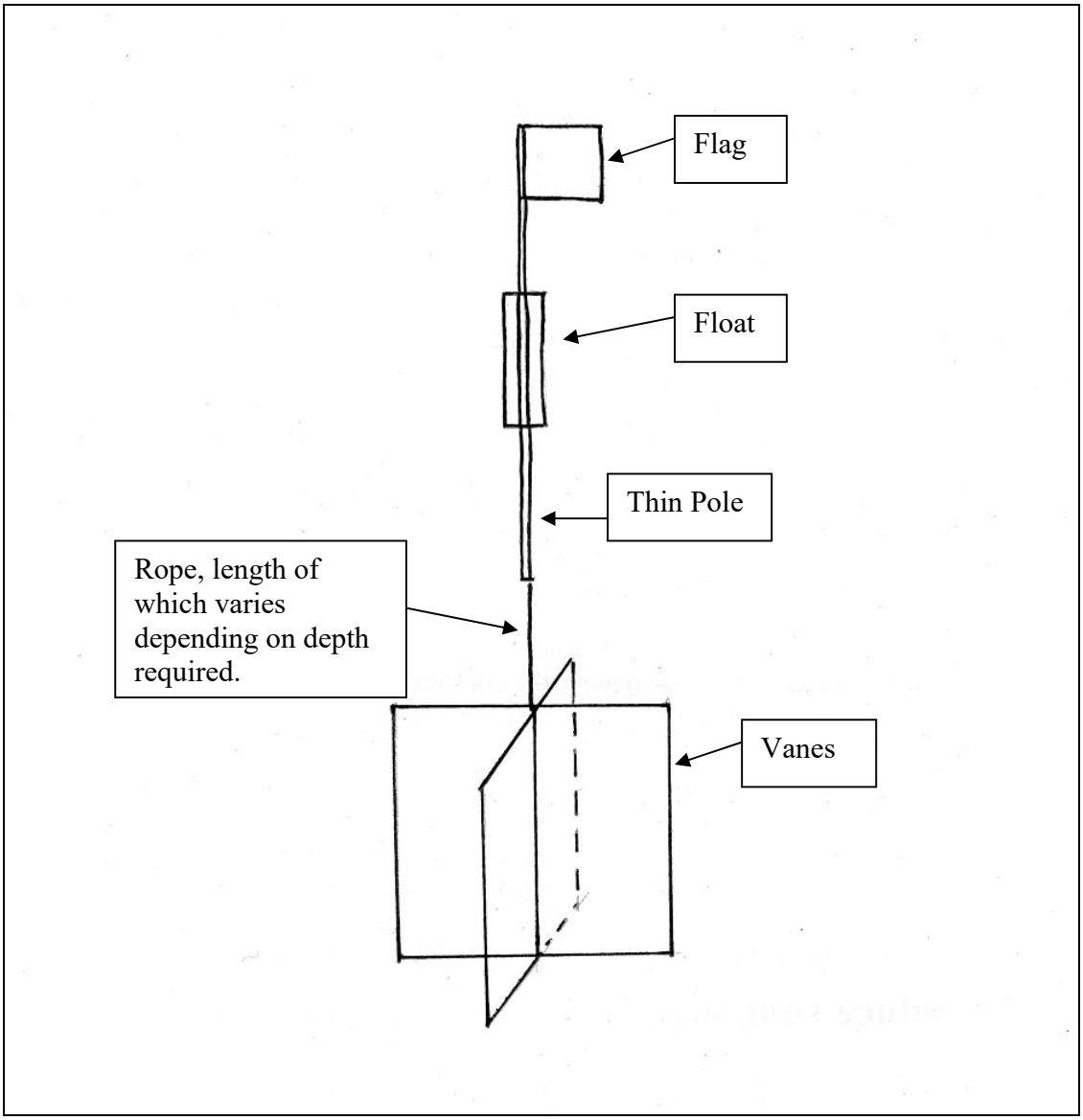

Figure 1: Typical Cruciform drogue arrangement.

3. Positioning

The navigation receiver used during all survey work was the Trimble AgDGPS 132. The unit was interfaced and logged to Hypack Max survey software to provide real-time line guidance and a continuous record of position for the entire survey. Position data was output in WGS ’84 Latitude and Longitude. On-line transformation of the WGS ’84 latitude and longitude positions to Irish National Grid took place within the survey programme.

This navigation unit provides sub-meter differential position accuracy. The accuracy is better than 1m horizontal.

4. Tides

In order to see the maximum excursion of the drogue it is necessary to carry out the study over a Spring Tides, in this case, the tides on the day were just below Mean Spring Range.

Predictions from Admiralty Tide Tables give the following:

Dublin 22nd November 2006.
LW 05:25 1.0m
HW 12:02 4.0m
LW 17:45 1.0m.

It was agreed to proceed at this time as any further delay in waiting for a greater range could mean bad weather or the dredging campaign was over.

The times of High and Low water were ideal as it gave Mid-flood and ebb tide times at suitable times to enable the drogues to be released and recovered whilst visibility was still reasonable.

5. Weather

Weather conditions were good throughout the day, wind was very light, southwest force 1-2.
The sea was flat with no swell enabling the drogues to be visible and easily identifiable at all times.

6. Vessel

A small half decker (approximately 30ft) was mobilised and worked out of Skerries for the survey. The M.F.V. Lios Darragh was under the control of Mr. Frank Rogan who was familiar with the area of work.

The layout of the vessel was good in that it had a sheltered wheelhouse to install the navigation equipment and a release point for the drogues alongside the wheelhouse.

The vessel mobilised from Skerries at 06:30hrs on the day and demobilised at 20:00hrs.

7. Operations

After mobilising from Skerries the vessel proceeded to the designated dump site.
Following a release by the dump vessel 3 drogues were released from the survey boat, a suitable time delay was allowed so as not to allow the drogues to interface with each other.

Following release each of the drogues were tracked and their position taken at random intervals. The survey vessel approached the drogue from the rear of its direction of travel so as not to impede its track and speed. Once alongside the position was recorded against time. This procedure was followed until the drogues had reached the limit of their general track line and turned. In each case drogues turned seawards or offshore. None of the drogues headed in a landwards direction. After it became clear the drogue was heading offshore it was recovered and stored aboard.

8. Charting and Results

On return to the office the position of each release, fix and recovery was plotted against time after release. It was then possible to calculate the velocity of excursion for each of the drogues between each fix. The velocities between each fix were then added to the chart. On inspecting the chart it can be seen that the velocities decrease as the tide slackens and as it approaches low or high water the drogues turned offshore.

In general the drogues travelled parallel to the coast in either a North-South or South-North direction, at no time did they travel in a direction that would indicate any shoreward direction of travel. From this, it would be reasonable to assume that no sediment would come ashore when released from the designated dump site. If this exercise was to be carried out at Neap Tides the velocities would be lower and therefore even less possibility of a shoreward movement.

The results are presented in the following charts: **HS: 131_01/06**
HS: 131_02/06

9. Personnel

The survey was carried out by Mr. Colin Johnston, Dip Geosurveying and assisted by Mr. Matthew Bevan.

Mr Johnston has over 20 years experience of Hydrographic Surveying including drogue tracking, current metering and general hydrography.

Report Prepared By:

Mr Colin Johnston	Senior Surveyor	Dip GeoSurveying.

Report Approved for Issue By:

Mr J.B. Jenkins	Project Manager	F.I.S.

Flood Drogue Release

319000E 320000E 321000E

282000N 281000N 280000N 279000N

see inset for recovery point

Site	Drogheda Dump Site
Location	Drogheda
Survey	Flood Drogue Release

Client
Drogheda Port Company

Surveyed by
Hydrographic Surveys Ltd.
The Cobbles, Crosshaven, Co. Cork. Ireland.

Consulting Engineers
Malone O`Regan

Memoir
1. Constructed on Irish Grid.
2. Horizontal control by D.G.P.S.
3. Release point shown by 0:00 and recovered by Rec.
4. Elapsed time shown thus 10:30 = 10 min. 30 seconds.
5. Velocities are in m/sec. = m/s
6. Wind, light South westerly.

Key

Drogues shown thus
- Surface drogue 1 meter below surface
- Mid drogue 7 meters below surface
- Bottom drogue 14 meters below surface

Drwg. No. HS 131-1/06
Project No. 58/06
Date 22/11/06
Scale 1:5000

Drawn by G.C.
Checked by C.J.
Approved by

0 50 100 150 200 250 300 350 400 450 500m
scale in metres

215:00 0.05 Rec. 233:10
0.15
188:00
0.22
160:00
0.30
Rec. 223:40
0.11
195:40
0.15
166:50
128:40
0.20
139:40
0.05 Rec. 229:00
202:00
0.23 0.38 0.13
173:00
0.18
108:30
150:10 92:40
0.30 0.20 0.38
120:50
73:00 0.22
66:50
98:50
0.39 0.33 0.30
81:30
48:40
0.25
0.42
67:00
38:40 0.25
53 45 N
0.40
28:30
44:20
0.40
0.27
22:30
33:00
0.38
15:30
0.24
18:10
10:00
0.23 0.37
0.38
8:00
0.22
Release Point 0:00

LW +2:30

6 12 W

6 10 W

Drogheda Dump Site

Tel. 00 353 21 4831184
e-mail info@hydrosurvey.com

Ebb Drogue Release

53 45 N

6 10 W

Drogheda Dump Site

321000E

322000E

279000N

278000N

277000N

276000N

HW +2.20

Release Point 0:00

53 44 N

0.42
0.27
0.26
17:20
18:00
15:20
0.21
0.25
36:25
0.35
37:40
0.18
54:10
33:00
0.23
0.18
0.34
55:50
71:50
0.13
0.21
88:20
50:20
74:15
0.33
108:35
0.12
126:15
0.08
0.20
150:00
65:40
0.07
0.02
0.02
Rec. 231:00
175:30
205:10
0.30
93:30
80:20
0.18
111:25
0.17
0.30
130:30
100:20
0.13
145:15
0.25
0.09
170:10
117:45
0.05
190:30
0.03
219:00
Rec. 230:00
0.02
0.24
137:10
0.16
163:10
0.12
180.20
0.08
198:10
0.02
210:00
0.02
Rec. 225:00

0 50 100 150 200 250 300 350 400 450 500m

scale in metres

0

270° 090° 180°

Site	Drogheda Dump Site
Location	Drogheda
Survey	Ebb Drogue Release

Client
Drogheda Port Company

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Hydrographic Surveys Ltd.
The Cobbles, Crosshaven, Co. Cork. Ireland.

Consulting Engineers
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Memoir

1. Constructed on Irish Grid.
2. Horizontal control by D.G.P.S.
3. Release point shown by 0:00 and recovered by Rec.
4. Elapsed time shown thus 10:30 = 10 min. 30 seconds.
5. Velocities are in m/sec. = 0.21
6. Wind, light South westerly.

Key

Drogues shown thus

- Surface drogue 1 meter below surface
- Mid drogue 7 meters below surface
- Bottom drogue 14 meters below surface

Drwg. No.	HS 131-2/06
Project	No. 58/06
Date	22/11/06
Scale	1:5000

Drawn by G.C.
Checked by C.J.
Approved by

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