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On Inland Ports, Waterways &  
Dredging

**NEW TECHNOLOGIES  
AND THEIR IMPACT  
ON PORT DEVELOPMENT  
IN JAMAICA**





# JAMAICA: AT A GLANCE



**2.83 million**

Population (2016)



**3** Public wharves

**4** Cruise Ports



**512** Cruise Calls

**> 3,500** Cargo (2016)



**1.57 Million TEUs**

Throughput (2016)



**11,424 sq. km**

Area



## **PORTS IN JAMAICA ARE AFFECTED BY**

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- Vulnerability of Jamaica's port facilities to sedimentation due to proximity of impact sources such as rivers/gullies is normally of paramount concern to the Authority in Jamaica as is the
- Dredging constraints due to Environmental considerations.
- Economic considerations imposed by high cost of environmental mitigation measures.

# THE PORT AUTHORITY'S PURPOSE & RESPONSIBILITY

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- Restore water depths – ship navigation (mandatory for port authorities)

## Public Ports

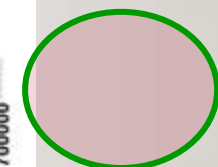
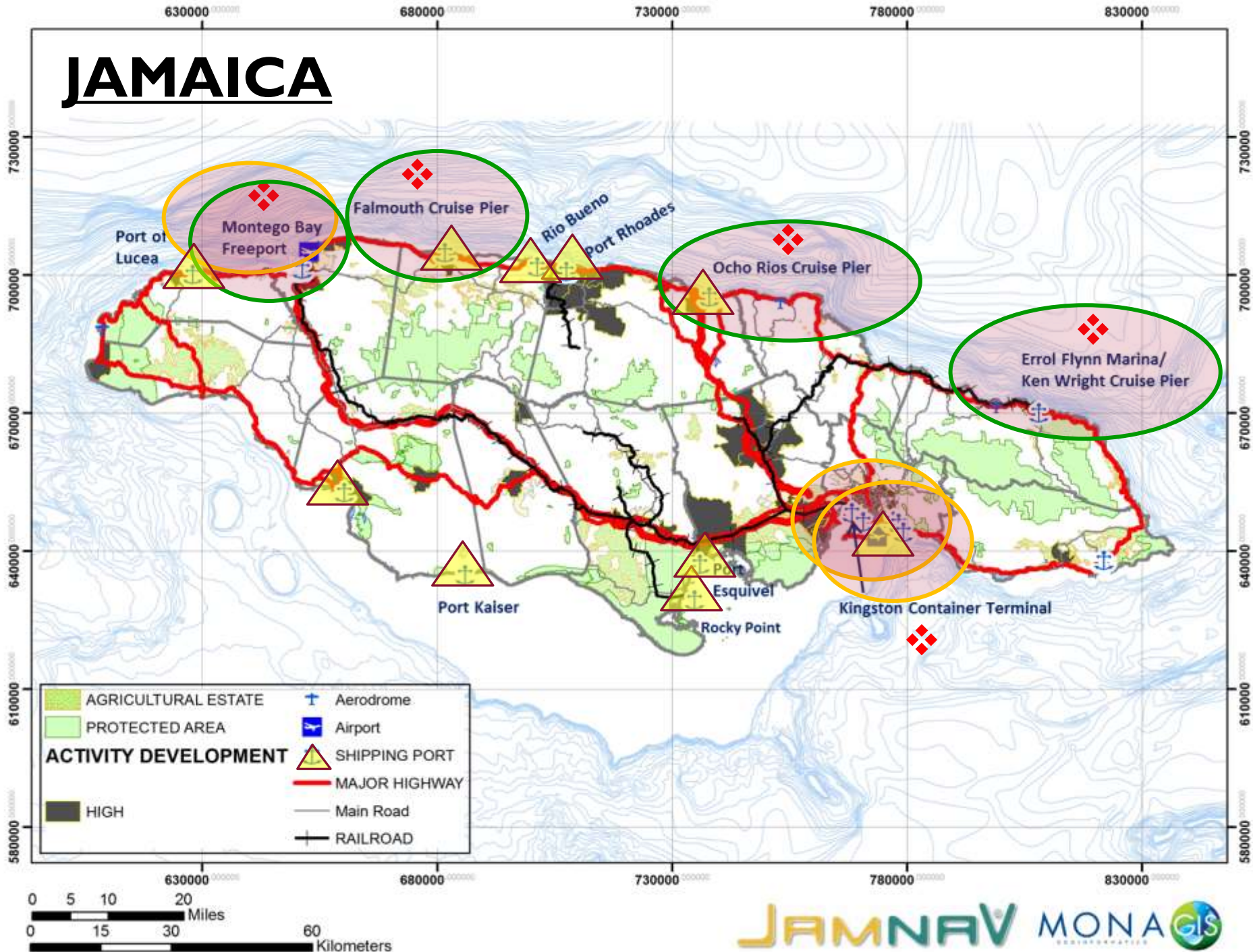
- PAJ responsible for safety of navigation & of waterways in all ports.
- Dredging of all Government-owned ports
  - incl. the main access channel in Kingston; provides access to private facilities.

## Private ports/ Sufferance wharves

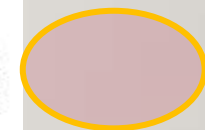
- Dredged by private owners/operators.



# JAMAICA



4 Cruise Ports



3 Public wharves



Private Ports



# PAJ CRUISE PORT LOCATIONS

**Ocho Rios**



**Falmouth**



**Montego Bay**



**Portland**



# Public Wharves

**Kingston Freeport Terminal**



**Kingston Wharves**



**Montego Freeport**



# **NEW TECHNOLOGIES IN DREDGING & THEIR IMPACT ON PORT DEVELOPMENT IN JAMAICA**

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- Dredging is a fundamental activity for most if not all ports and harbours. The activity in its most basic form includes the excavation of the floor of the sea or river and removal of the material to dump or storage site.
- The desire for the use of the material would suggest greater processing of the material for specialized use such as ;
  - Reclamation
  - Nourishment
  - Fill etc.



- Commonly the Dredge system is classified as;
  - Hydraulic Dredge system – use of water to transport dredge sediment to its final destination using some conveyance means such as pipeline, hopper or barge
  - Mechanical Dredge system – moves sediment by physical process say bucket or clam shell, truck etc. to the final destination
- These systems in recent years have been enhanced by the uses of ;
  - Global Positioning systems
  - Dredging control systems
  - Dynamic positioning systems
  - Cutter Drag Heads
  - Dredge Pump etc.



- The use of any of these systems or combination of, will enhance the dredge operation and should provide a positive impact on the process by increasing productivity and improving efficiency.
- It is of note however that without the consideration of the systems mentioned the use of more unsophisticated software and equipment solutions also provide significant impact to the development of ports in respect of the impact on economic activity.
- In the last 15 years the Port Authority has carried out a number of major dredging campaigns which have resulted in significant impact on the Port Development in Jamaica.

# **NEW TECHNOLOGIES IN DREDGING & THEIR IMPACT ON PORT DEVELOPMENT IN JAMAICA**

During these 15 years the Authority has carried out 3 Major dredging campaigns. Two in the Port of Kingston and one in Port of Falmouth, detailed as follows;

1. Maintenance and Capital Dredging of the Kingston Harbour Access Channel and Turning Basin in 2002
2. Capital Dredging as part of the Falmouth Cruise Ship Terminal Development in 2009/10
3. Maintenance and Capital Dredging of the Kingston Harbour Access Channel and Turning Basin in 2017 (in progress).



# WHAT IMPACT HAS NEW TECHNOLOGIES HAD ON THE OUTCOME OF THESE THREE PORT DEVELOPMENT PROJECTS

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# DETAILS OF THE 2002 KINGSTON HARBOUR DREDGING & RECLAMATION PROJECT

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- Dredging and Reclamation carried out by Jan De Nul using;
  - Cutter Suction Dredger – Leonardo da Vinci and
  - Trailer Dredge – Cristoforo Colombo
- Average Dredge Depth – -13m
- Dredge Volume – 4,500,000 m<sup>3</sup>
- Reclamation - over 30 Hectares



# KINGSTON HARBOUR 2002: PAJ DREDGED ACCESS CHANNEL TO -13M & RECLAIMED OVER 30 HECTARES

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RECLAMATION AREA – R2



RECLAMATION AREA – R1





# KINGSTON: 2002 RECLAMATION IN PROGRESS

RECLAIMED OVER 30 HECTARES (R1, R2 & R3)

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# KINGSTON: RECLAMATION COMPLETED 2002

## LANDS CREATED EARMARKED FOR NEAR PORT DEVELOPMENT



# FALMOUTH

## WORKING IN A SENSITIVE ENVIRONMENT

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- Boskalis Westminster - subcontractor for all Marine Works including;
  - Dredging and Reclamation
  - Environmental Management Plan
- Boskalis Westminster executed dredging and reclamation works using;
  - Cutter Suction Dredger – Ursa
  - Grab Dredger – Packman
- Average Dredge Depth – -12.5m
- Reclamation - over 20 Hectares





# FALMOUTH

## WORKING IN A SENSITIVE ENVIRONMENT

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- The Environmental Impact Assessment (EIA) conducted in 2007 indicated that besides coral reefs, mangroves and seagrass the project area contained also sensitive marine resources such as star fish, sponges, lobsters, sea-urchins, conch and bioluminescent phytoplankton (glistening waters)
- The Report identified the following potential impacts from the project:
  - Loss of habitat and diversity including coral cover, fish habitat, seagrass beds and bioluminescent plankton;
  - Increased turbidity and sedimentation level.

# **FALMOUTH** CONT'D

## **THE DREDGING CONTRACTOR RESPONSIBILITY INCLUDED**

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- Environmental Management Plan
- Coral Relocation and Seagrass Transplanting and Installation of Reef Havens and Reef Towers
- Installation of Silt Screens etc.
- Water quality monitoring



# FALMOUTH DREDGING & RECLAMATION WORKS: AN INNOVATIVE APPROACH

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- A return water sinkerline made of High Density Polyethylene (HDPE) □
- A closed 'environmental' bucket on the grab dredger







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# **FALMOUTH 2009: DREDGING COMMENCED ALONG WITH RECLAMATION OF > 20 HECTARES**

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**August 2009**



**Primo December 2009**



# FALMOUTH 2010: DREDGING & RECLAMATION COMPLETED

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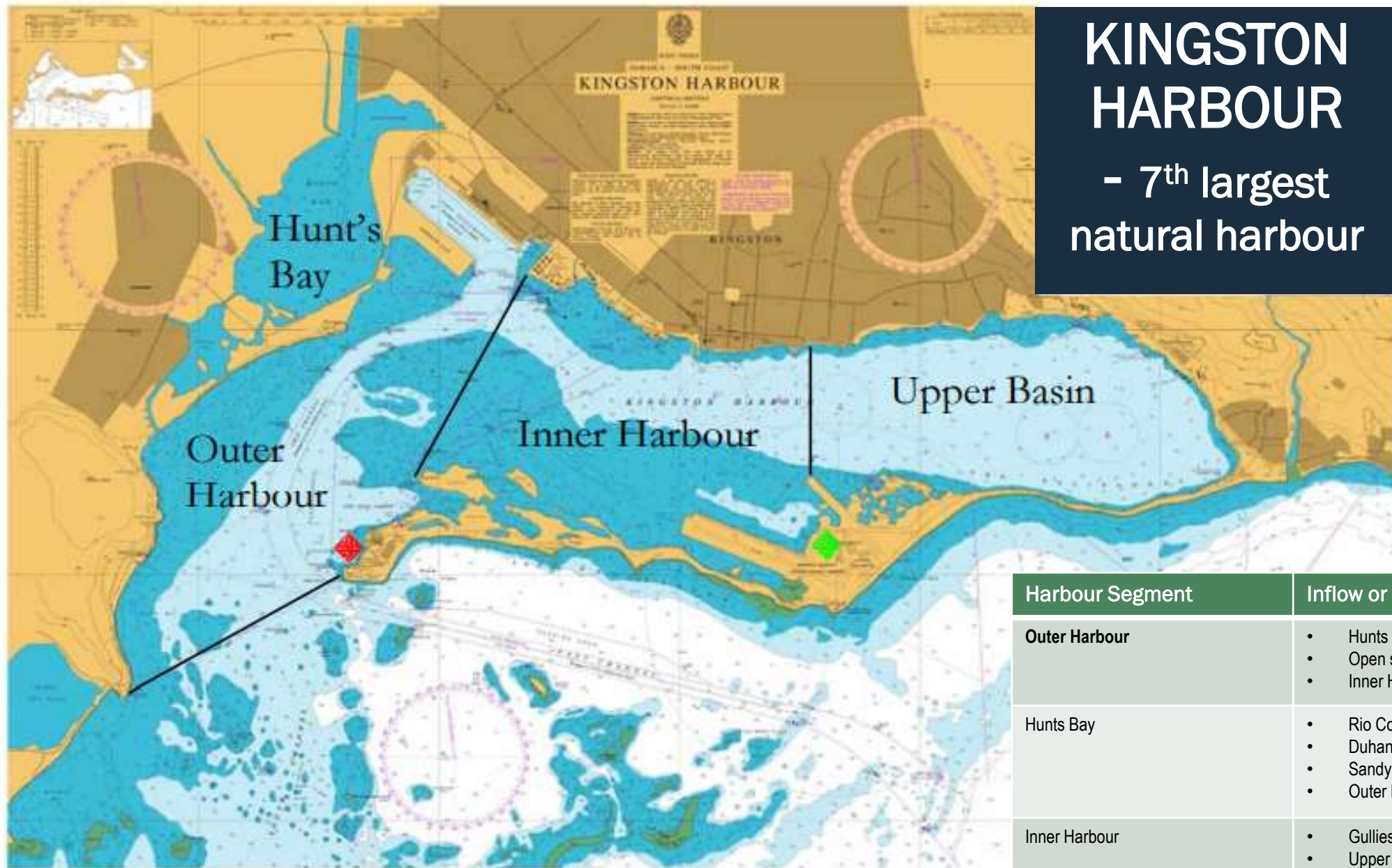
# MAIN HARBOUR IN JAMAICA HOME TO THE MAJOR TRANSHIPMENT PORT AT LEAST 7 PORT FACILITIES

> 2,500 SHIP CALLS PER ANNUM



# KINGSTON HARBOUR

- 7<sup>th</sup> largest natural harbour



Source: NEPA Water Quality Model Selection Report 2005

Harbour Segment	Inflow or Exchange
Outer Harbour	<ul style="list-style-type: none"><li>Hunts Bay</li><li>Open sea</li><li>Inner Harbour</li></ul>
Hunts Bay	<ul style="list-style-type: none"><li>Rio Cobre</li><li>Duhaney River</li><li>Sandy Gully</li><li>Outer Harbour</li></ul>
Inner Harbour	<ul style="list-style-type: none"><li>Gullies,</li><li>Upper Basin</li><li>Outer Harbour</li></ul>
Upper Basin	<ul style="list-style-type: none"><li>Springs (Rockfort)</li><li>Gullies</li><li>Inner Harbour</li></ul>



# **FACTORS ATTRIBUTABLE TO SILTATION IN KINGSTON HARBOUR CHANNEL/BASIN**

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- **Debouch from Hunts Bay (Sandy Gully, Rio Cobre & Duhaney rivers).**
- **Storm drains under dock structures.**
- **Run off from gullies entering Harbour.**
- **Side slope failure.**
- **Material movement from ship's propeller action during manoeuver.**



# SEDIMENTATION - HUNTS BAY & KINGSTON HARBOUR



Total Sediment Load to Entire Harbour (1968)= 1,011,000 tons (silt/clay) and 563,000 tons (sand/gravel).

Data source: Extract, 1968 Stanley report.



# Solid Waste from Flood Event



# IMPLICATIONS

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- Further draft reduction resulting in restriction on vessel size/cargo.
- Difficulty in maneuvering.
- Possibility of propeller damage.
- Stakeholder dissatisfaction/complaint.
- Effect on port reputation, marketability.



# CONCESSION AGREEMENT FOR PORT OPERATION FINANCING THE CAPITAL AND MAINTENANCE DREDGING

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In 2016 the Port Authority signed a Concession Agreement with the Kingston Freeport Terminal Limited (KFTL) for a 30-year term concession with the right to Finance, Expand, Operate, Maintain and Transfer the Kingston Container Terminal (KCT) at the end of the concession period.

**The Agreement will also see the Concessionaire dredging the access channel to the Kingston Harbour and the basin of the KCT (now KFTL) to allow for the handling of the larger vessels that will transit the Panama Canal after its expansion.**



# KINGSTON HARBOUR DREDGING COMMENCED JANUARY 2017

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# KINGSTON HARBOUR DREDGING PROJECT 2017




- Dredging and Reclamation carried out by Jan De Nul Subsidiary SADRACO SAS using;
  - Cutter Suction Dredger – Marco Polo and
  - Trailer Hopper Suction Dredge – Pedro Alvares Cabrá
- Dredge in 2 phases; Phase I average Dredge Depth -15.5m
- All dredge material dumped at sea
- Silt Screens 500m to be installed between dredge site and sunken city of Port Royal





## THE DREDGING HAS BEGUN

January 5, 2017 by admin  KFTL

After months of detailed planning and preparation in which Kingston Freeport Terminal Ltd was granted an Environmental permit by the National Environment and Planning Agency (NEPA), the company launched its dredging campaign on Thursday January 5th. The dredging campaign is an important aspect of KFTL's development plan for the terminal, which is aimed at the significant development of the terminal's infrastructure.

The objective of this campaign is to widen the access channel and deepen the shipping basin to accommodate the large Post Panamax Vessels that are expected to make regular calls at KFTL after transiting the newly expanded Panama Canal.

The campaign, which will be executed on a 24 hours per day, seven days per week basis, is scheduled to last between 6 and 8 months and is being undertaken by Sodraco International. During this time KFTL will host a number of members of the Sodraco team who will be working on the project.

The ability of terminals in the Caribbean and Latin American region to accommodate the New Panamax Vessels transiting the Panama Canal is, to a large extent, impacted by the draft available at the terminal. Under the Port Development Plan, KFTL will widen and deepen the Kingston Harbour access channel, the turning circle and the terminal basin to accommodate vessels with a draft of up to 14.7 meters.

The dredging campaign, which is guided by extensive environmental impact studies, involves the removal of over approximately 7 million cubic meter of dredge material. Dredging began on January 5<sup>th</sup> 2017 and is anticipated to last for approximately 8 months.







## THE 10,034 TEU MV TANYA CALLS KFTL

September 16, 2016 by admin KFTL

It was a bleak and rainy morning as KFTL welcomed the wife of Jamaica's Governor General, Lady ALLEN, members of Women in Maritime Association Caribbean (WIMAC) and the MV Tanya on their first visit to the terminal. So warm was the welcome reception that it seemed to blow the rain away. The visit occurred on the same day that Captain Dean took over this eight-month-old vessel en route from Cartagena and to Caucedo. A formidable structure capable of holding 10,034 TEUs of cargo, the Neo Panamax CMA CGM Tanya is named for Tanya SAADE ZEENNY, Executive Director for the France-based CMA CGM Group.

The host of the visit, Kingston Freeport Terminal Ltd, took over the responsibility to operate and develop the container terminal since July of 2016. To date KFTL, under the leadership of CEO Olivier TRETOUT, has managed to improve the productivity of the terminal and significantly increased the number of vessels of various sizes taking advantage of their services. This has resulted in KFTL becoming one of the leading terminals in productivity, of all the terminals at which CMA CGM vessels call.

Members of the KFTL management team that went on board included: Karen SUTHERLAND - CFO, Dianne GOBAN - HR Manager and Kelly GREENAWAY - Legal Counsel. At a small reception which followed the tour the CEO Mr. Olivier TRETOUT joined the women of WIMAC, and staff of CMA CGM and KFTL in welcoming Lady ALLEN and the other visitors to the terminal and adding his support to the efforts of the organization. In his comments, Mr. TRETOUT affirmed that KFTL holds high the ideals of gender equality and the empowerment of the entire workforce.

Source: Jamaica Gleaner





# Conclusion

- Kingston 2002 was completed within the project timeline and while the project did have some issues the general objectives were met and has resulting in availability of lands which is a catalyst for economic development.
- Falmouth 2010 was also completed within the project timeline and to date has been recognized as a huge success, especially when the sensitive environmental issues are concerned.
- Kingston 2017 is still in progress but to date the dredging has progressed without much issue. The capital dredging is about to commence with the expectation that the works will be completed in accordance with the objective within the time specified.

Thank

You

