

**GOLDEN STAR**



**RESOURCES LTD.**

# **Wassa/HBB Presentation**

**February, 2013**

# Legal and Other Matters

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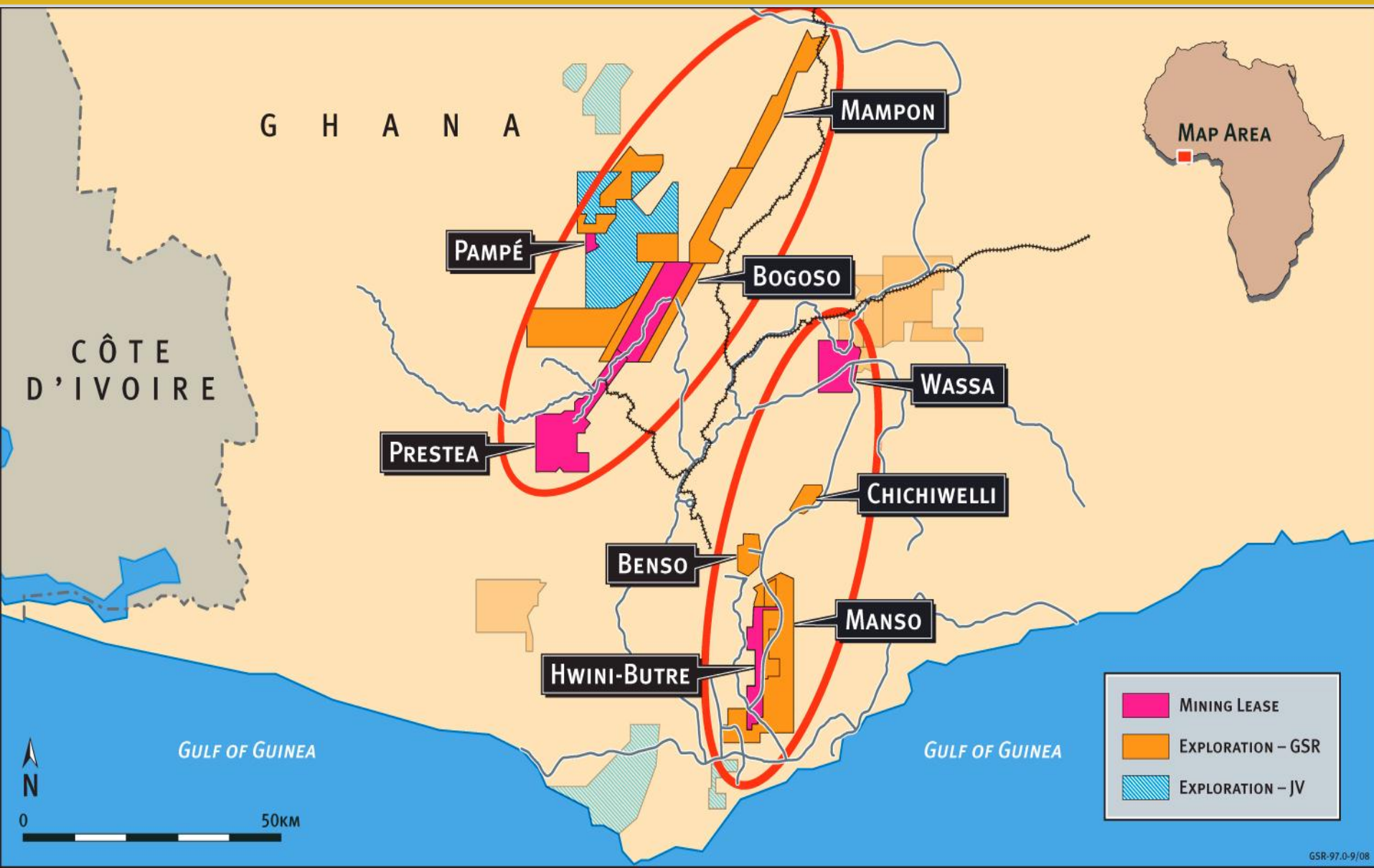
**CURRENCY:** All monetary amounts refer to United States dollars unless otherwise indicated.

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# Wassa/HBB History

- ★ September 2002 Acquisition by Golden Star
- ★ June 2003 Feasibility study complete
- ★ March 2004 Environmental permit issued
- ★ December 2004 Major construction completed
- ★ April 2005 Commercial operations commenced
- ★ December 2005 St. Jude acquired
- ★ May 2007 HBB feasibility approved
- ★ August 2008 HBB first ore delivered to Wassa Mill

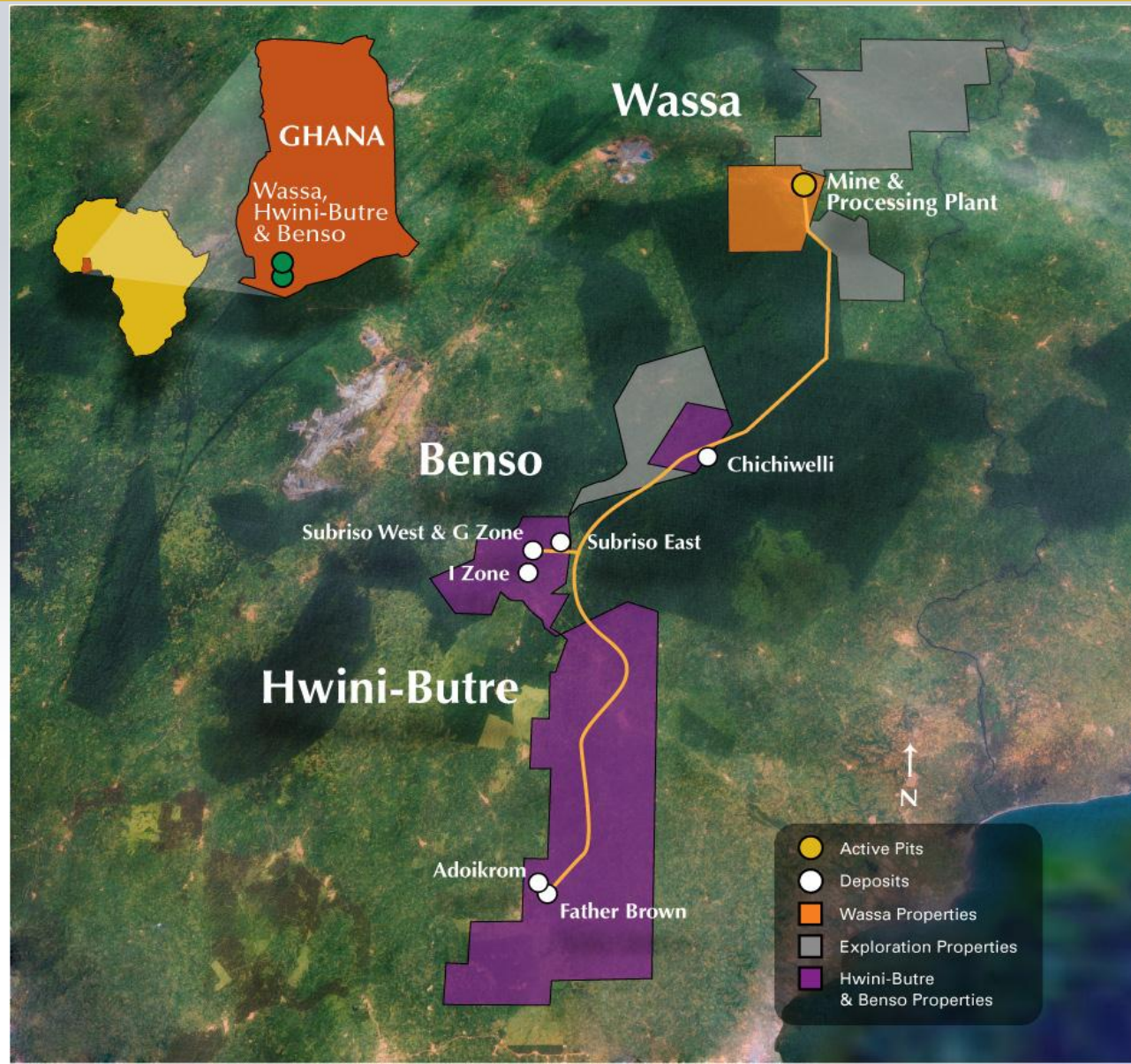
# Wassa/HBB Location in Ghana





# Wassa

- ★ Conventional CIL 2.7Mtpa plant commissioned in 2005
- ★ Ore from both Benso and Hwini-Butre being blended with Wassa ore
- ★ Excellent exploration potential
  - Manso property proximal to Hwini-Butre
  - Chichiwelli – situated on the HBB haul road



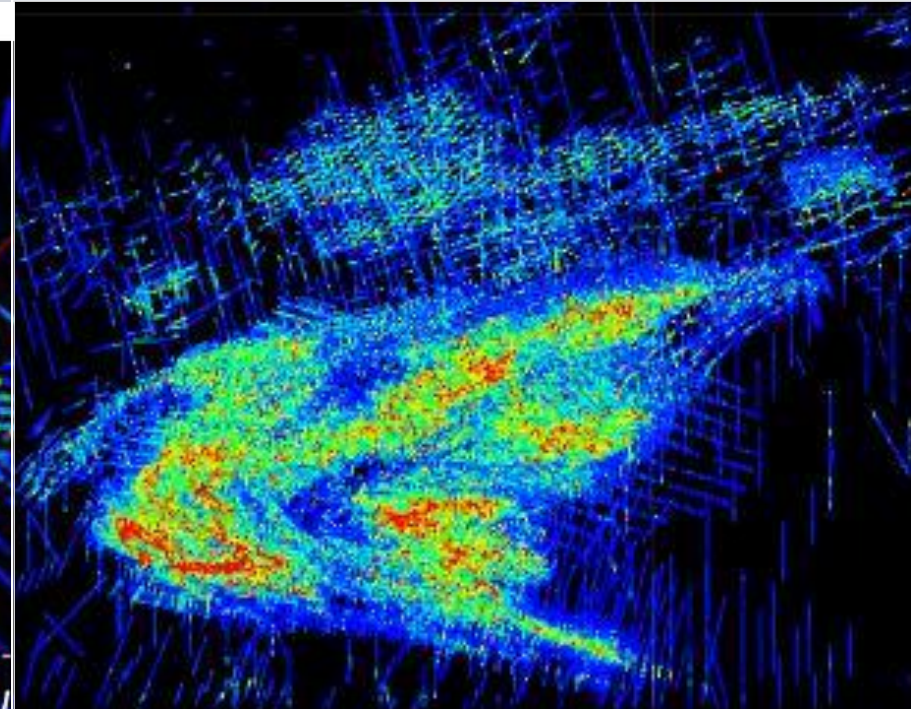
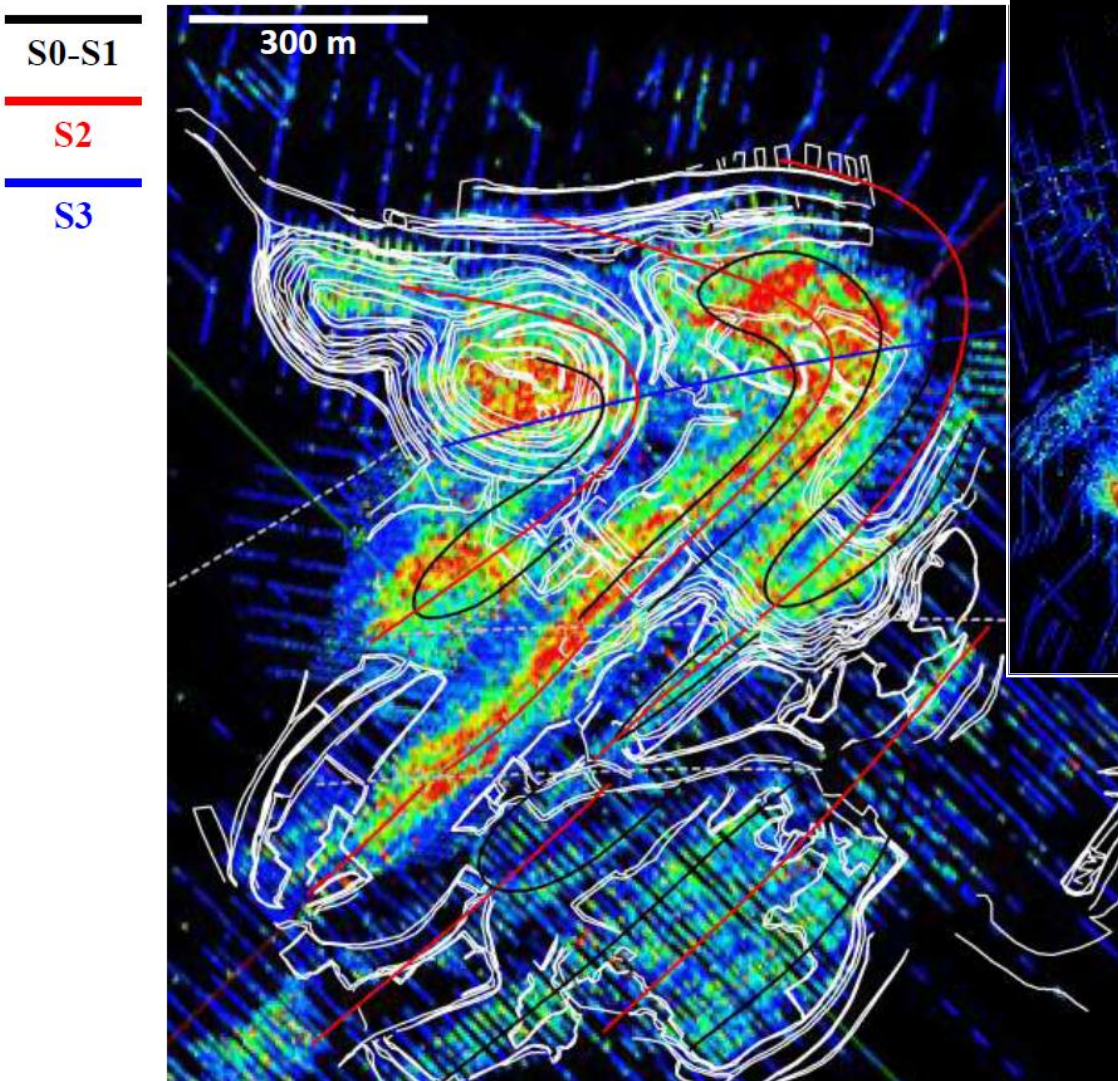
# 2013 Exploration Budget \$20 million

|                                     | Q1                 | Q2                 | Q3                 | Q4                 | 2013                |
|-------------------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Wassa Expansion Drilling            | \$5,435,860        | \$4,852,813        | \$1,331,873        | \$1,278,051        | \$12,898,597        |
| Prestea Under Ground                | \$598,541          | \$668,070          | \$795,545          | \$774,229          | \$2,836,385         |
| Prestea Surface                     | \$4,832            | \$226,672          | \$864,574          | \$0                | \$1,096,077         |
| Mampon                              | \$412,172          | \$704,119          | \$0                | \$3                | \$1,116,295         |
| Other Ghana                         | \$79,539           | \$66,010           | \$3                | \$0                | \$145,552           |
| Drilling Capital including GC drill | \$857,582          | \$13,582           | \$0                | \$0                | \$871,164           |
| Ivory Coast                         | \$43,455           | \$38,103           | \$35,938           | \$42,644           | \$160,141           |
| South America                       | \$269,775          | \$88,596           | \$12,086           | \$65,886           | \$436,342           |
| Denver Exploration                  | \$140,963          | \$120,163          | \$90,563           | \$81,763           | \$433,450           |
|                                     |                    |                    |                    |                    |                     |
| <b>Exploration 2013 totals</b>      | <b>\$7,842,718</b> | <b>\$6,778,128</b> | <b>\$3,130,581</b> | <b>\$2,242,576</b> | <b>\$19,994,003</b> |

- ★ **TOTAL PROPOSED 2013 BUDGET AFRICA \$20 MILLION**
- ★ **Exploration to focus on Wassa Main and Prestea West Reef UG drilling**
- ★ **Confirmation/Infill/resource conversion drilling to be done at Mampon and Prestea South ahead of mining in 2014**



# Folded Quartz Veins System - Wassa



Leapfrog Data, Wassa Mine, 2010





- ★ Gold associated with quartz veins with sulphide alterations mainly pyrites. Economic mineralization is characterized by swarms of quartz veins and veinlets plus sulphides which are individually boudinaged and folded upon itself.





**Lack of Continuity in mineralization along strike due to complex folding and structural complexity**

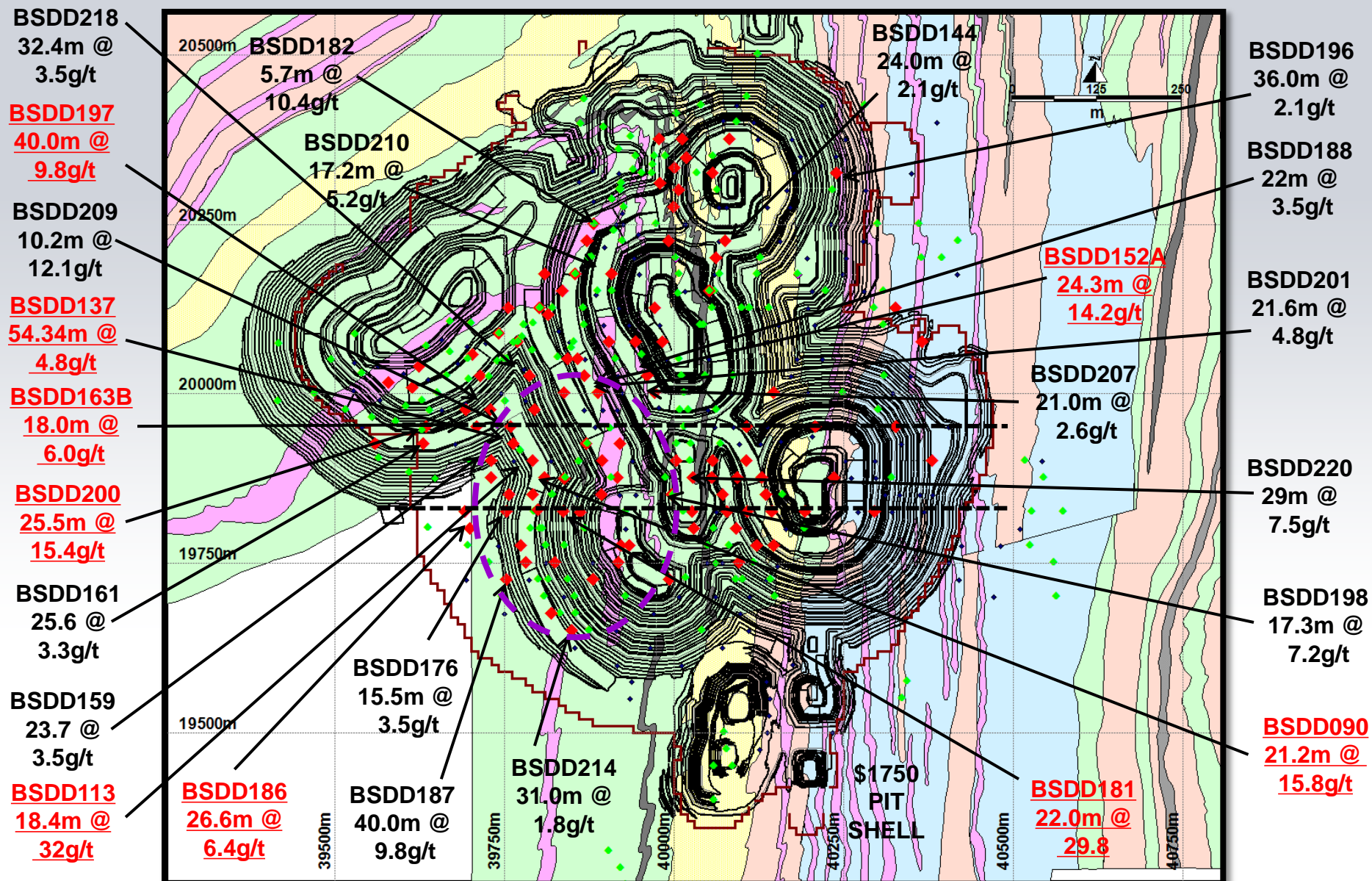
# Wassa B Shoot High Grade zone

- ★ B Shoot High grade fold hinge zone drill tested over 200 m strike length
- ★ Ten Diamond Drill holes have intersected the zone thus far and it remains open down plunge
- ★ 2013 drilling to infill and expand this zone for inclusion in the 2<sup>nd</sup> half of the year resource model update

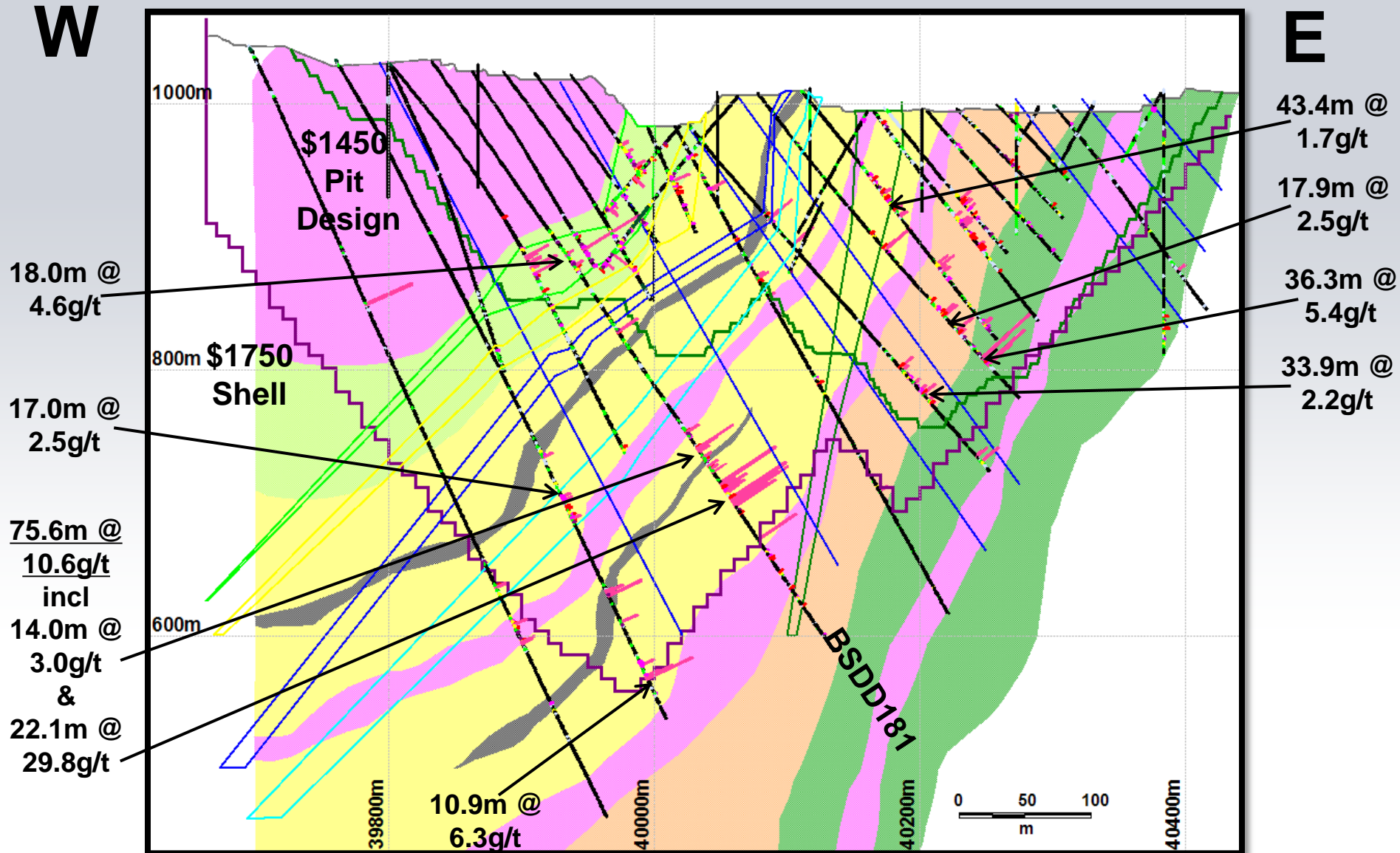
| Hole ID  | Easting (m) | Northing (m) | Elevation (m) | Azimuth (°) | Dip (°) | From (m) | To (m) | Drilled Width (m) | ~ True Width (m) | Gold Grade g/t |
|----------|-------------|--------------|---------------|-------------|---------|----------|--------|-------------------|------------------|----------------|
| BSDD152A | 39895       | 20000        | 993           | 90          | -60     | 265.3    | 290.0  | 24.7              | 24.3             | 14.2           |
| BSDD197  | 39751       | 19975        | 1022          | 90          | -55     | 393.5    | 433.6  | 40.1              | 39.9             | 9.8            |
| BSDD163B | 39713       | 19950        | 1036          | 90          | -52     | 434.5    | 452.5  | 18.0              | 18.0             | 6.0            |
| BSDD200  | 39632       | 19950        | 1047          | 90          | -50     | 482.5    | 508.0  | 25.5              | 25.5             | 15.4           |
| BSDD137  | 39769       | 19925        | 1030          | 90          | -56     | 373.0    | 445.0  | 72.0              | 54.3             | 4.8            |
| BSDD113  | 39792       | 19900        | 1031          | 90          | -61     | 372.5    | 398.5  | 26.0              | 18.1             | 32.0           |
| BSDD090  | 39809       | 19875        | 1030          | 90          | -58     | 368.3    | 397.3  | 29.0              | 21.2             | 15.8           |
| BSDD131  | 39756       | 19850        | 1032          | 90          | -64     | 446.0    | 468.0  | 22.0              | 14.4             | 6.1            |
| BSDD135A | 39760       | 19825        | 1033          | 93          | -60     | 506.5    | 521.9  | 15.4              | 10.9             | 6.3            |
| BSDD186  | 39701       | 19800        | 1044          | 90          | -60     | 389.0    | 416.0  | 27.0              | 26.6             | 6.4            |



# Wassa Main BS significant results Jan 13

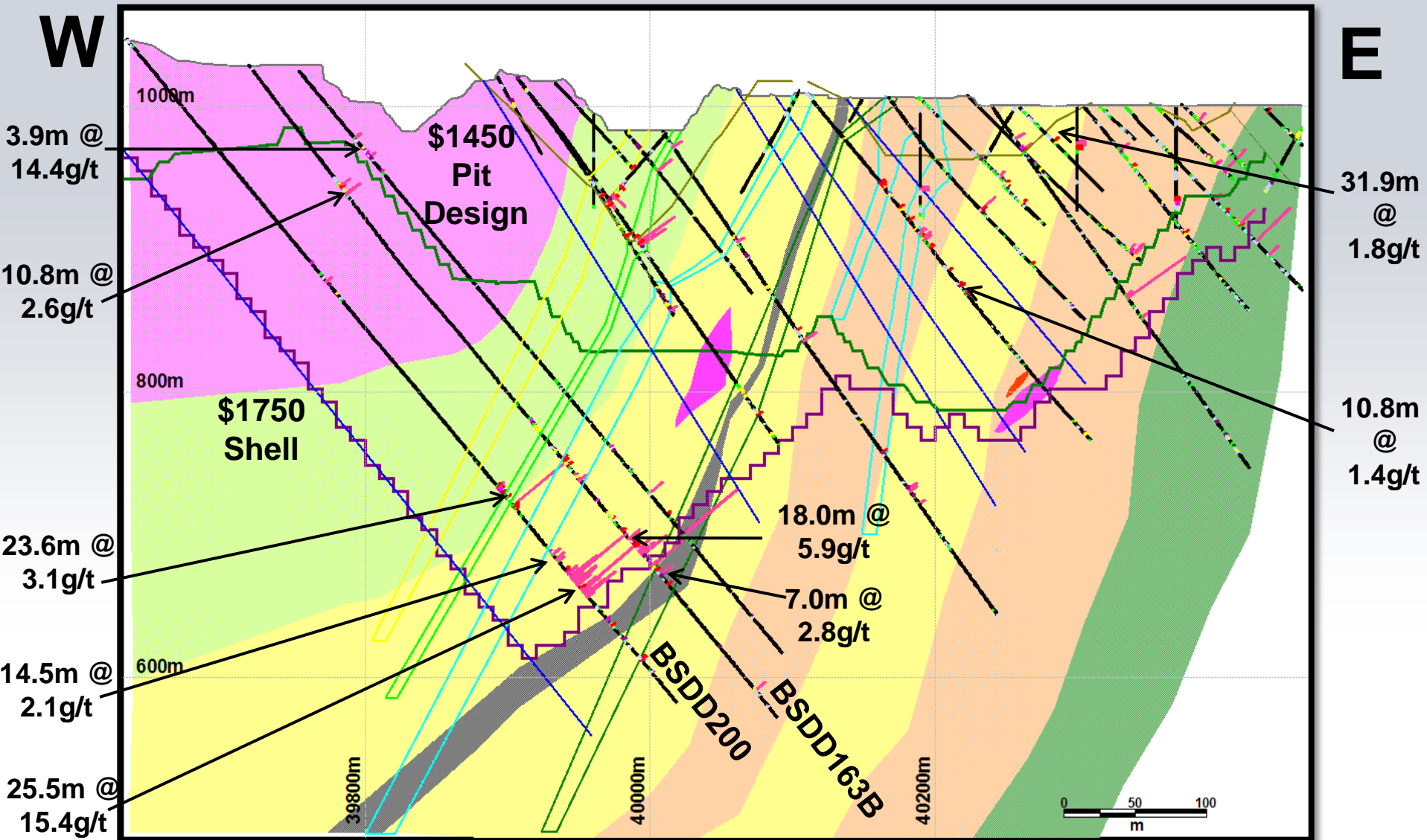


# WASSA (MAIN) SECTION 19825N

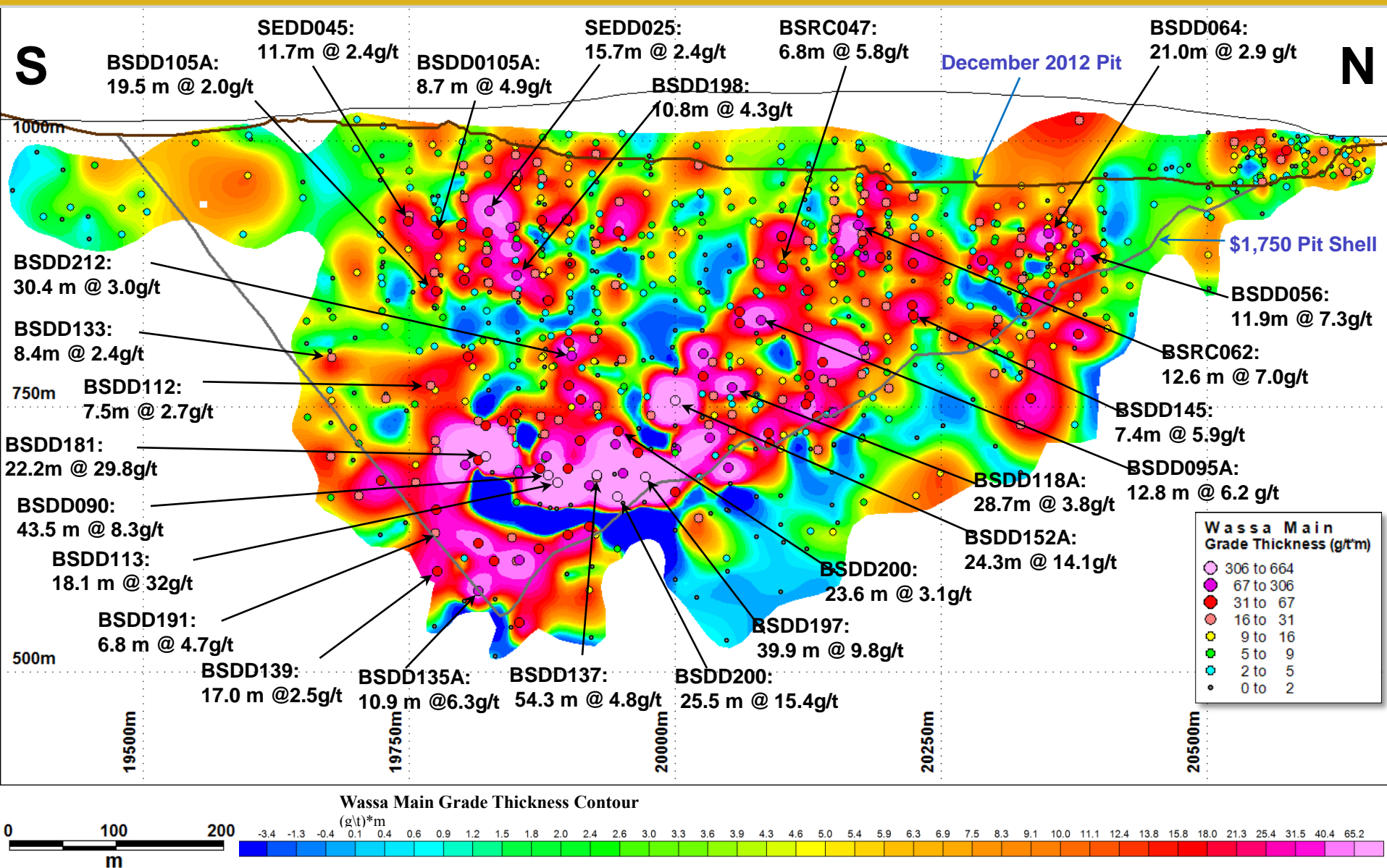




# WASSA (MAIN) SECTION 19950N



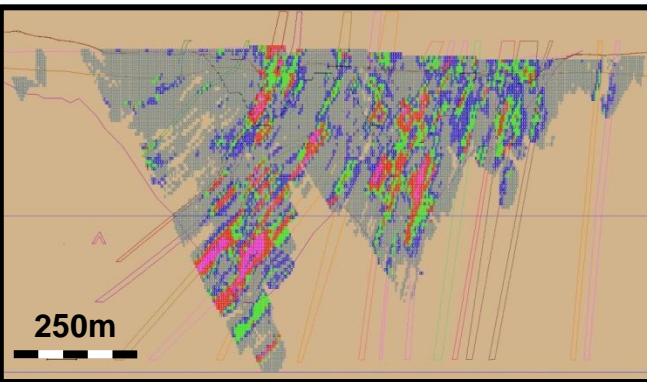
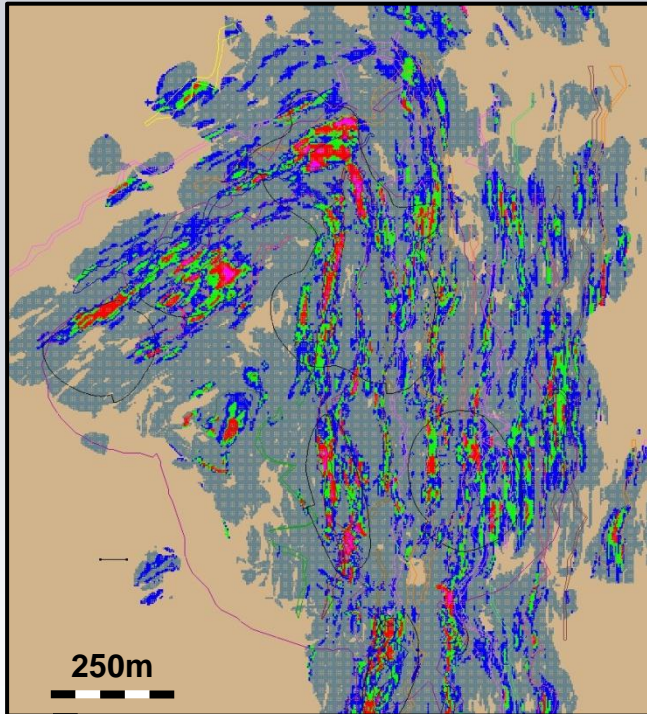
# Wassa Main Au Grade Thickness Long Section True Width





# Wassa updated resource models

GSE 12 Dynamic Anisotropy model

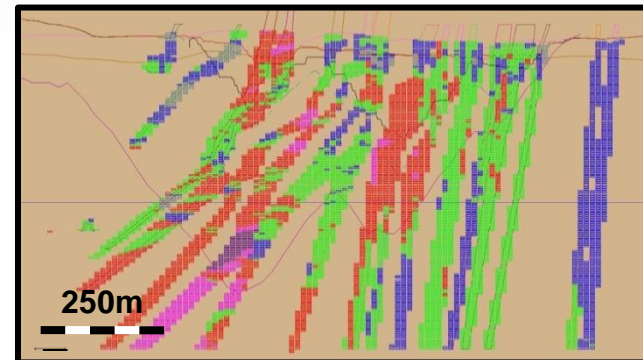
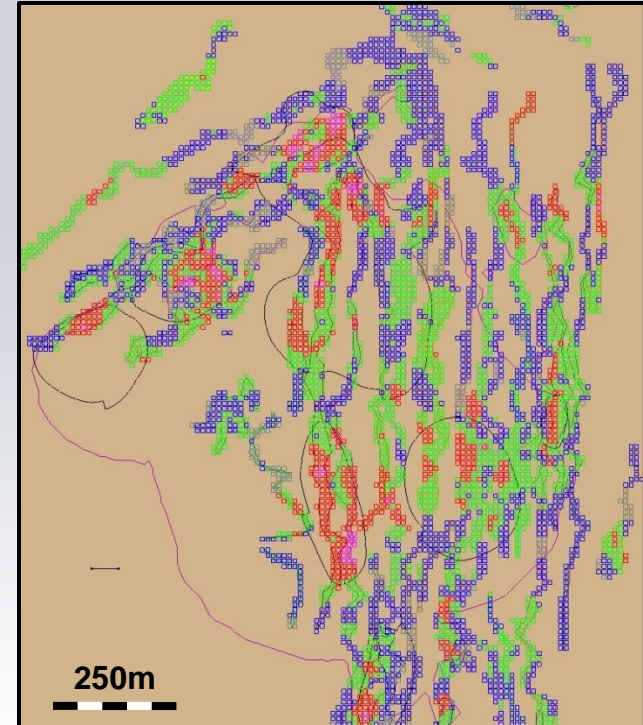


- ✦ Wassa deposit is difficult to block model due to complex folding geometries
- ✦ Evaluating several different modeling approaches to determine which best reflects actual mined and milled numbers

Blk Legend g/t

|          |  |
|----------|--|
| 0.01-0.2 |  |
| 0.2-0.5  |  |
| 0.5-1.0  |  |
| 1.0-2.5  |  |
| 2.5-5.0  |  |
| >5.0     |  |

GSE 12 OK model



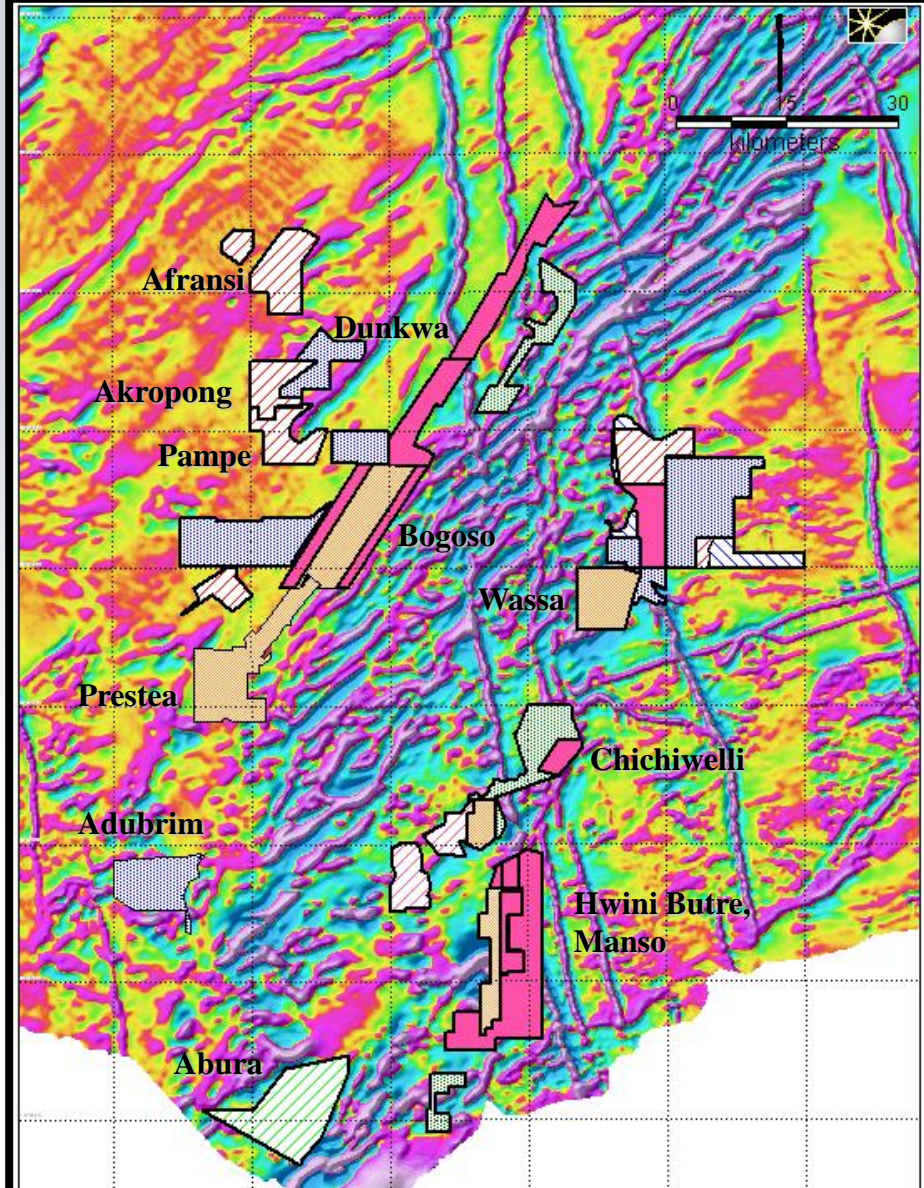


## Digitized by Google



Our Ghana mining and exploration properties are located in a tight geographical area, delivering operating synergies. We expect to start development of the Hwini-Butre and Benso properties in 2007, with the intent of hauling gold-bearing material from there to our Wassa mine.

- Active Pits
- Deposits
- Bogoso Properties
- Prestea Properties
- Wassa Properties
- Hwini-Butre & Benso Properties
- Exploration Properties







**HBB - LINEAR MINERALIZED ZONES**

# Hwini Butre Exploration update

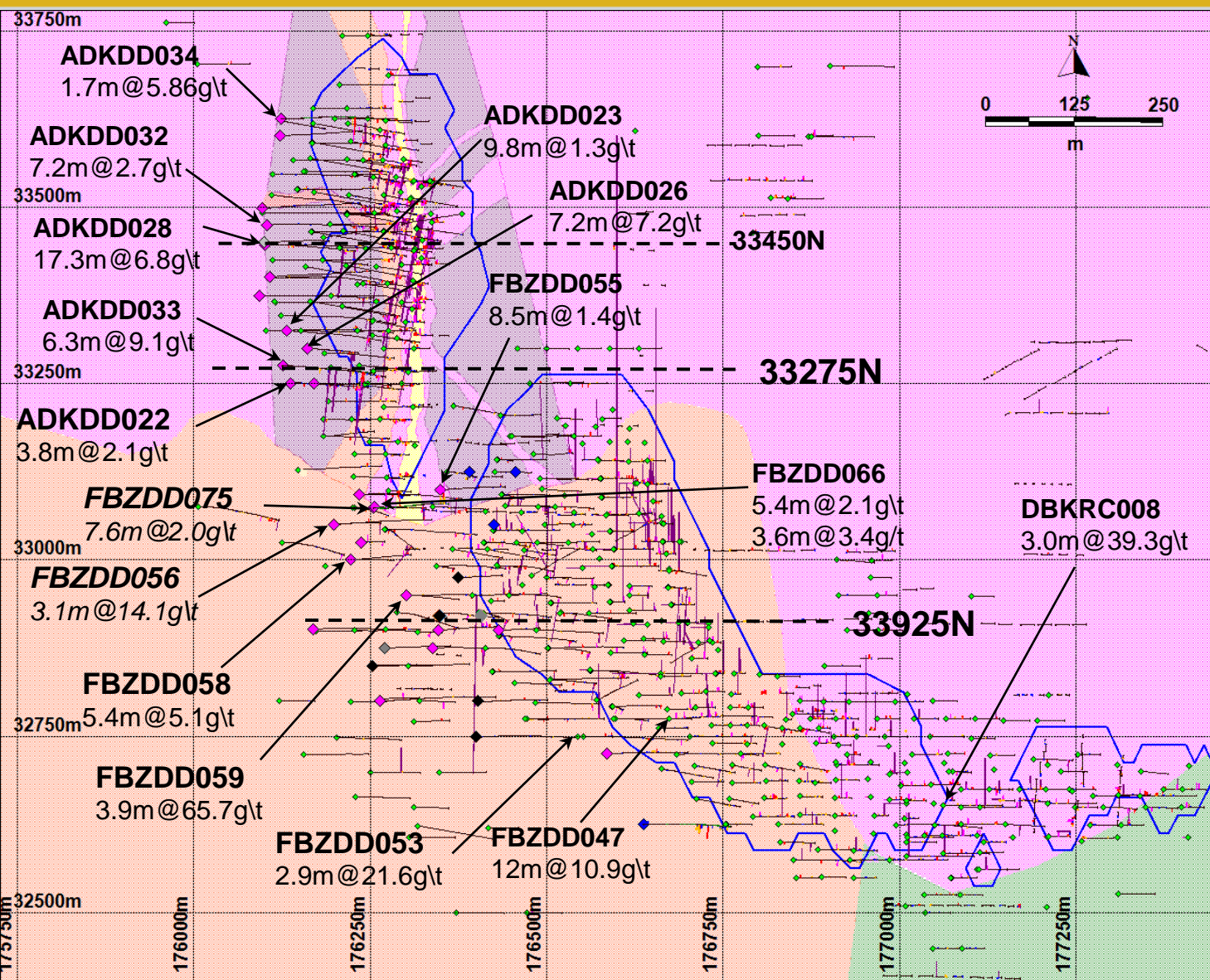
- ✦ 34 drill holes completed totaling 10,408 m completed YTD (11/30/12)
- ✦ Testing FBZ and ADK zones at depth
- ✦ FB holes have targeted down dip and along strike where the main structure was intersected but grades were marginal
- ✦ ADK deeper drilling has intersected wider higher grade zones of mineralization below the mined out pit







# Father Brown - Adoikrom 2012 Drilling Planview



## Map Legend

- Main Mineralised Zone  
Sheared Felsic Volcanics  
Diorites, Quartz Veins
- Gabbro
- Diorite
- Mafic
- Granodiorite
- Felsic Porphyry
- Father Brown - Dabokrom  
\$1,500 Pit outline  
Adoikrom \$1,500 Pit outline
- Significant Intersections
- Drilled UG Hole
- Remaining Planned Holes
- Previous Drilling
- Assay Pending



# Father Brown Drilling Section 32925N






**FBZDD079**  
Drilled assay pending

**Current Pit**

## Map Legend:

|   |                |
|---|----------------|
|  | Laterite       |
|  | Saprolite      |
|  | Diorite        |
|  | Quartz Diorite |
|  | Granodiorite   |
|  | Major Ore zone |
|  | Minor Ore zone |

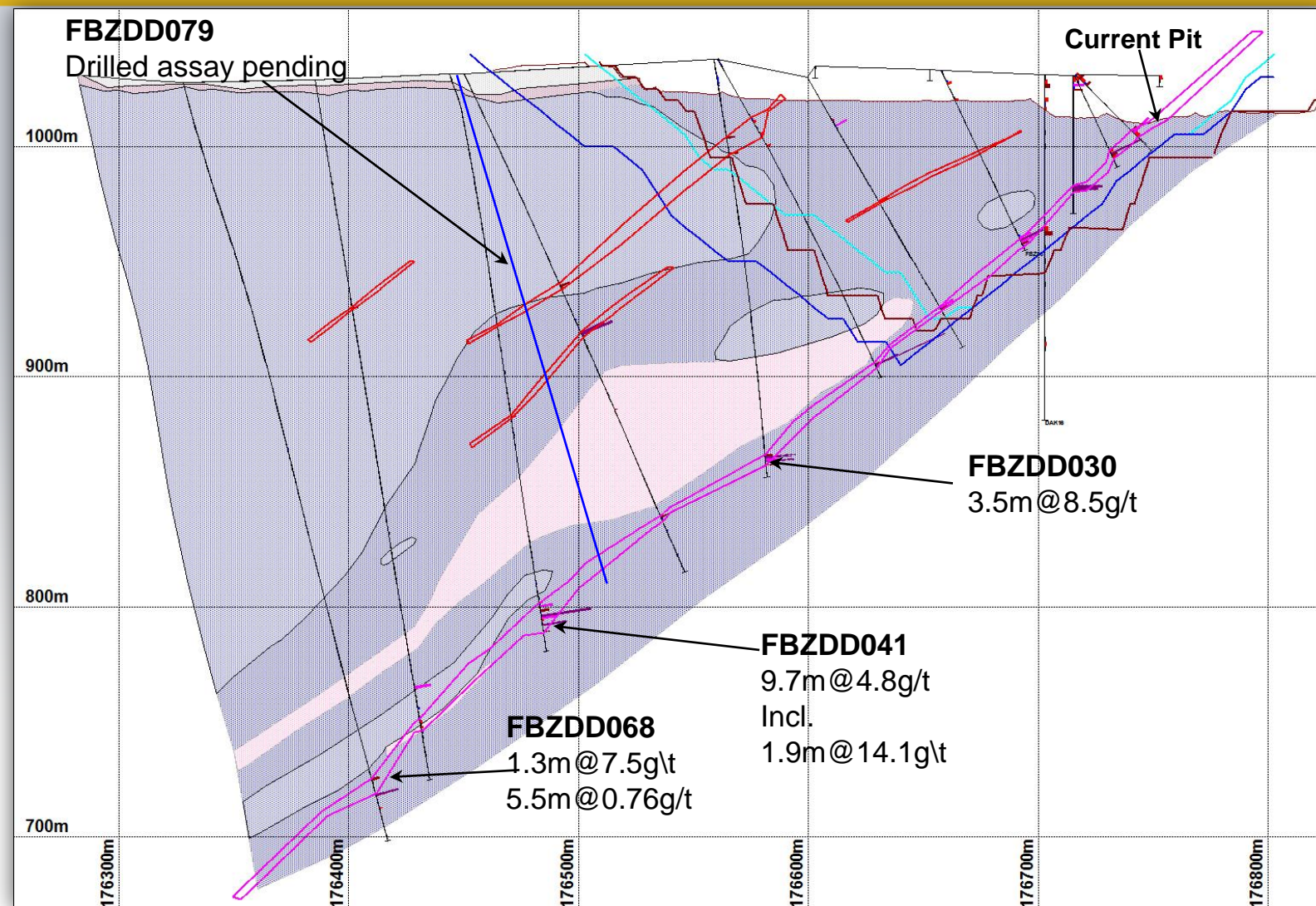
## Au Legend (g/t)

|   |           |
|---|-----------|
|  | 10 - 1000 |
|  | 5 - 10    |
|  | 2.5 - 5   |
|  | 1 - 2.5   |
|  | 0.5 - 1   |

**FBZDD030**  
3.5m@8.5g/t

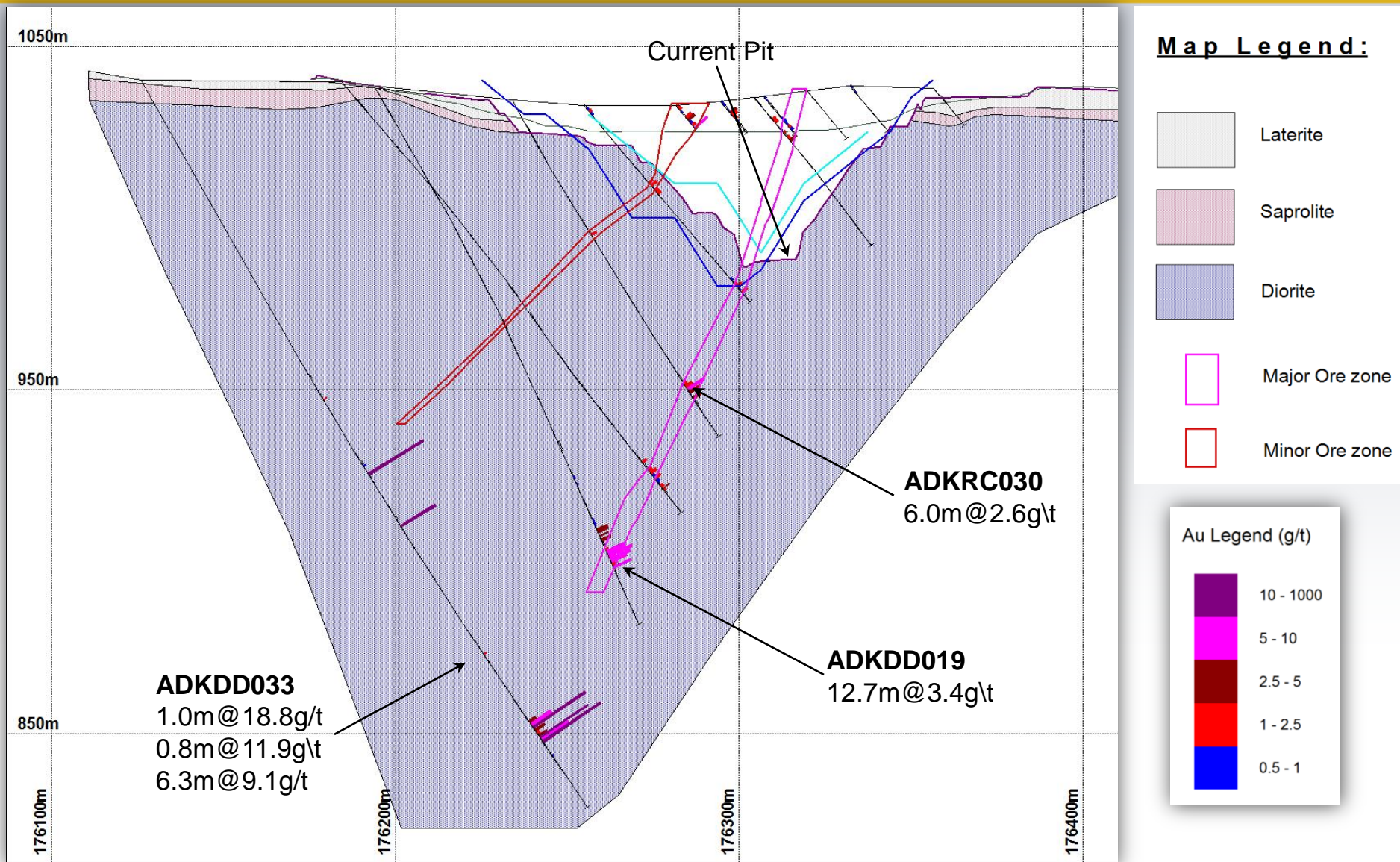
**FBZDD041**  
9.7m@4.8g/t  
Incl.  
1.9m@14.1g/t

**FBZDD068**  
1.3m@7.5g/t  
5.5m@0.76g/t





# Adoikrom Drilling Section 33275N



# Wassa/HBB Reserves & Resources

## ★ Proven & Probable Reserves

- 2012: 31.8M tonnes grading 1.44 g/t Au for 1.47M oz Au
- 2011: 18.1M tonnes grading 1.38 g/t Au for 0.8M oz Au

## ★ Measured & Indicated Resources

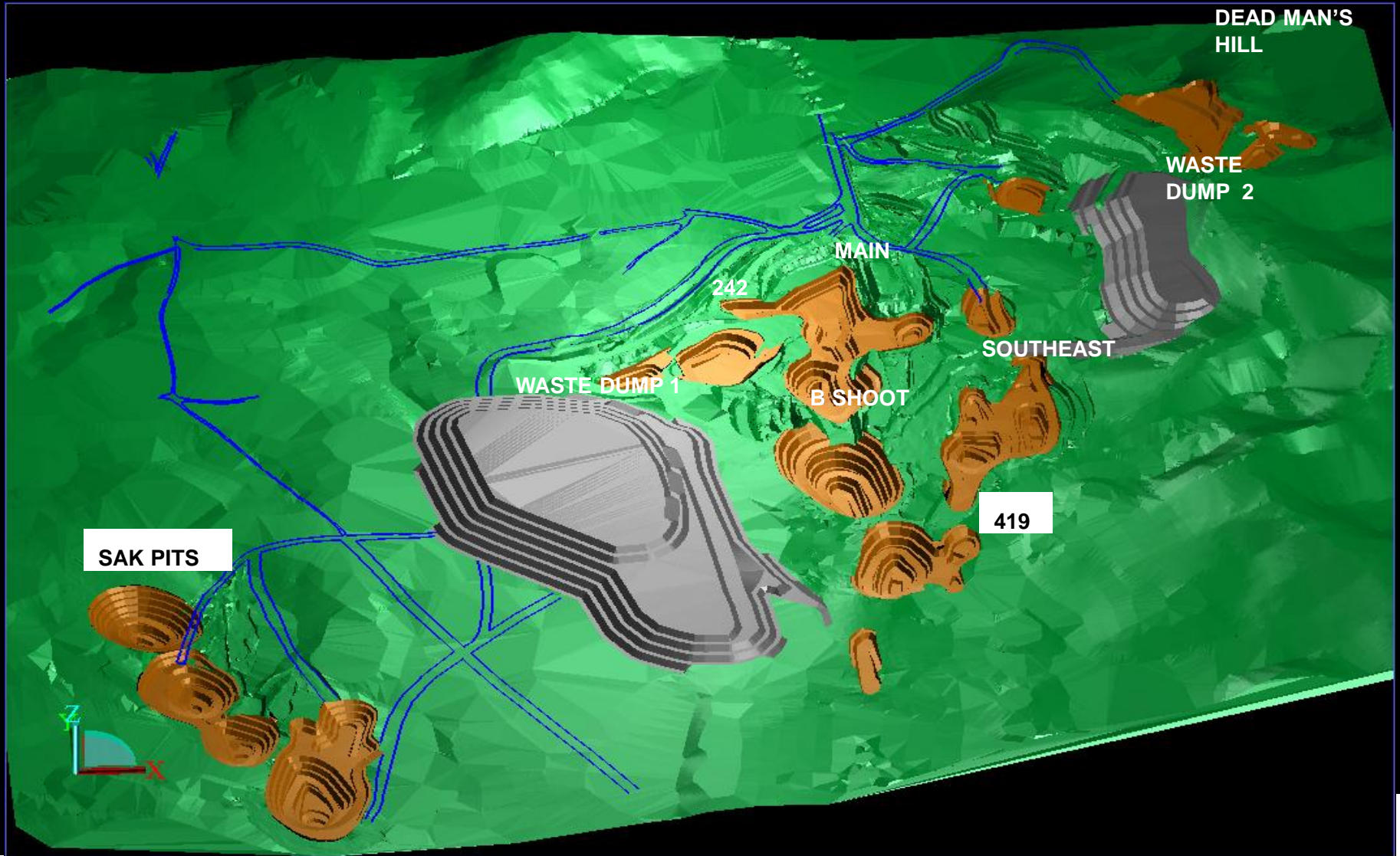
- 2012: 20.1M tonnes grading 1.3 g/t Au
- 2011: 20.0M tonnes grading 1.52 g/t Au

## ★ Inferred Resources

- 2012: 13.2M tonnes grading 1.7 g/t Au
- 2011: 2.1M tonnes grading 2.62 g/t Au

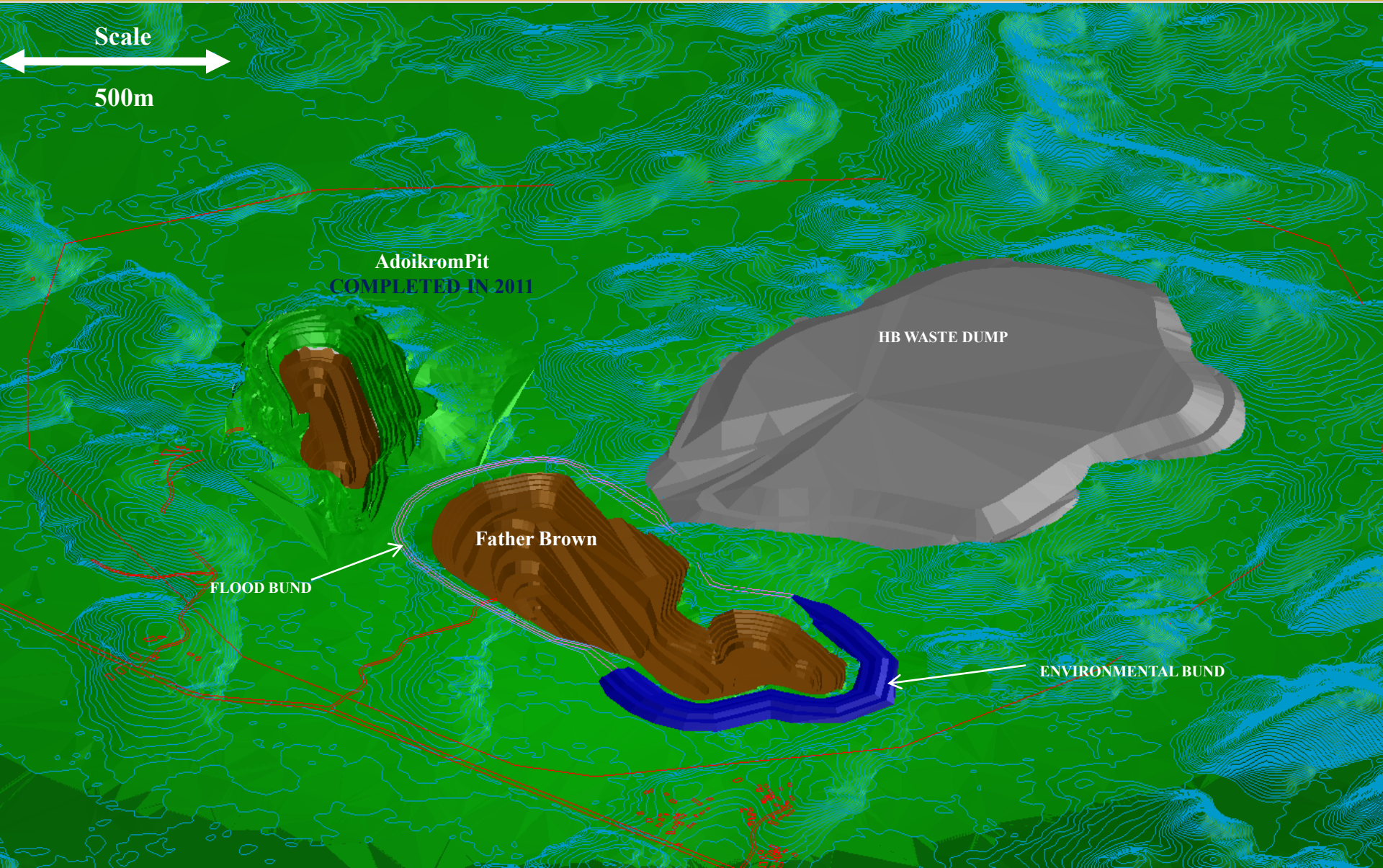


# Wassa Main Mining Locations





# Hwini-Butre Mining Location





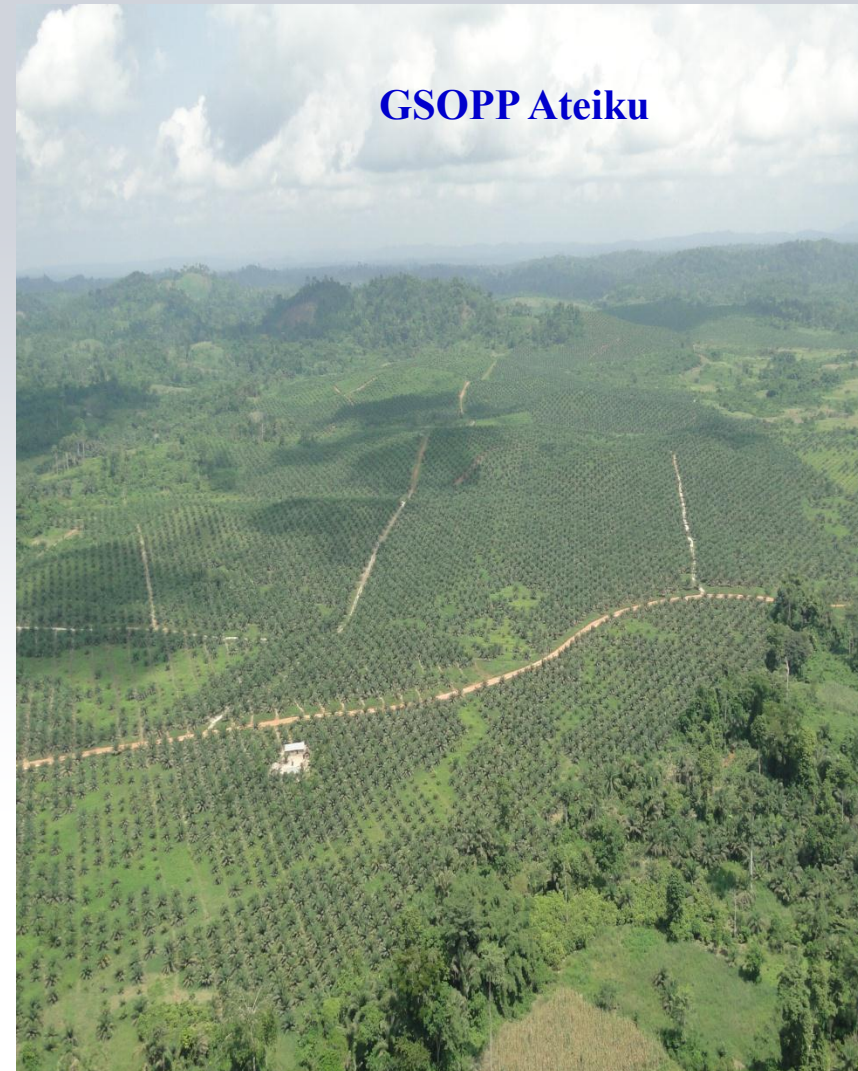
# Wassa/HBB Mining Fleet

## GSWL (Wassa & Benso)

|                      |    |
|----------------------|----|
| ★ 984 Excavators     | 3  |
| ★ 777D Dump Trucks   | 11 |
| ★ 773F Trucks        | 5  |
| ★ D9 Dozers          | 8  |
| ★ L8 Rigs            | 3  |
| ★ 988G F. E. Loaders | 3  |
| ★ Graders            | 4  |

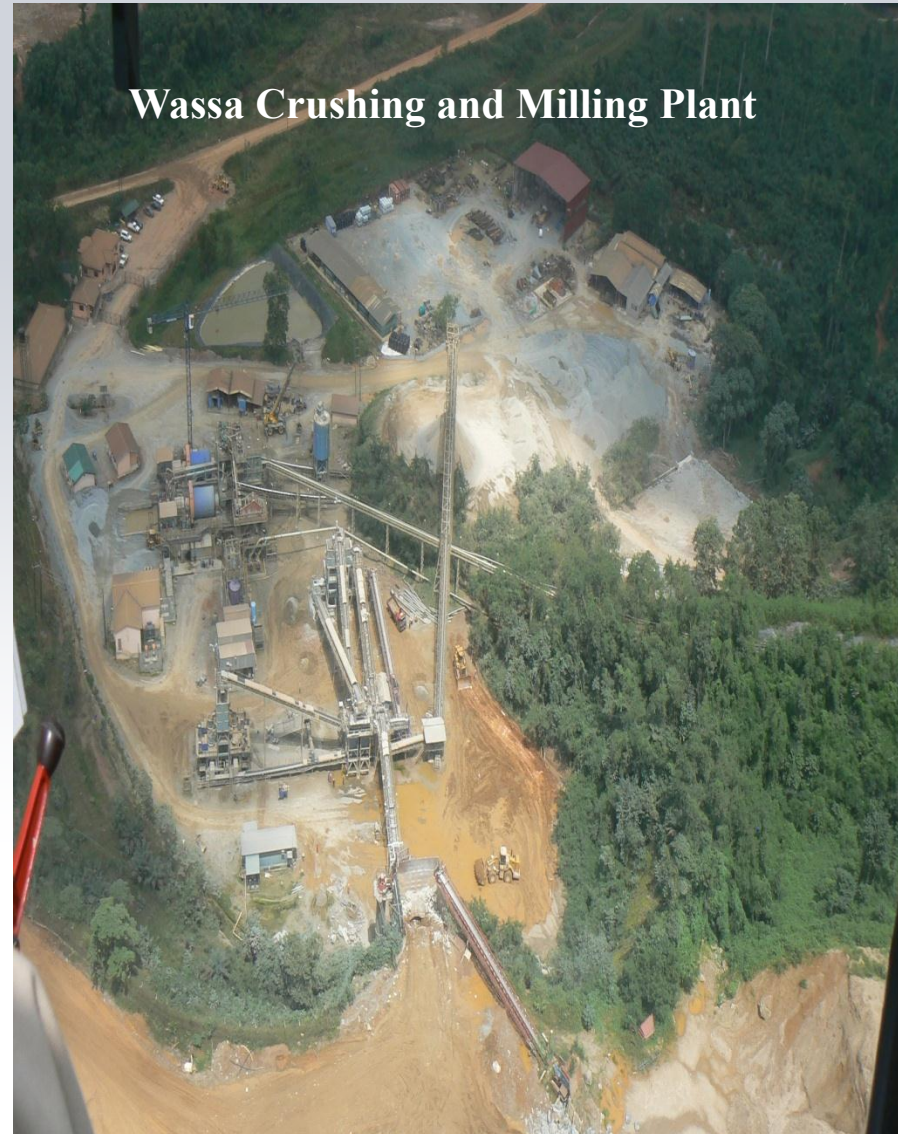
## Contractors (E & P)

|                 |    |
|-----------------|----|
| ★ Excavators    | 6  |
| ★ Trucks - A35D | 11 |
| ★ Trucks 777F   | 7  |
| ★ Graders       | 3  |
| ★ Dozers        | 5  |
| ★ Drills        | 6  |



# Process Plant Specifications

- ✦ 2.7 Mtpa throughput
- ✦ 4 Stage Crushing circuit
- ✦ 2 x 5.1 m x 6.7 m Ball Mills
- ✦ Grind 80% -106 micron
- ✦ Mills rated at 3 MW each
- ✦ Gravity recovery 25% and rising
- ✦ Cyanide introduced post ball mill
- ✦ 800m Pipe Reactor – 70% dissolution
- ✦ 6 x 2500 m<sup>3</sup> CIL Leach Tanks
- ✦ Metallurgical recovery of ~94%





# Wassa/HBB Update

- ✦ Revenue up year over year on higher production and gold prices
- ✦ Wet weather strategy for improved crushing completed
- ✦ Drilling high grade, wide width zone below the Wassa pits
- ✦ Future Cut Back at Father Brown is indicated by Red Line.



# Wassa/HBB 2012 Production Summary

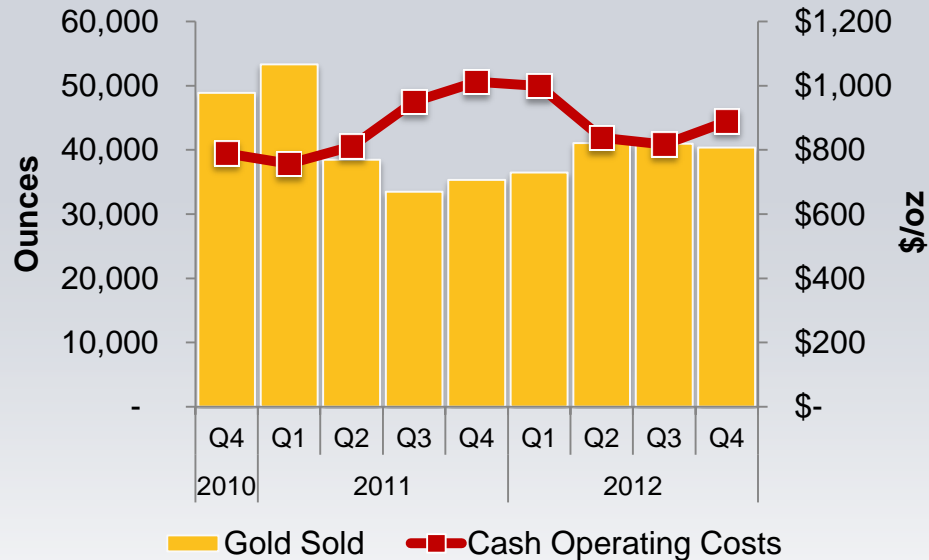
- ★ Full year gold sales of 158,899 oz at CoC of \$883/oz
- ★ Metallurgical recovery of 93.4%
- ★ Wassa tailings dam raise Phase 2 completed
- ★ High grade, wide width zone discovered below the Wassa pits – drilling ongoing





# Wassa Production Profile

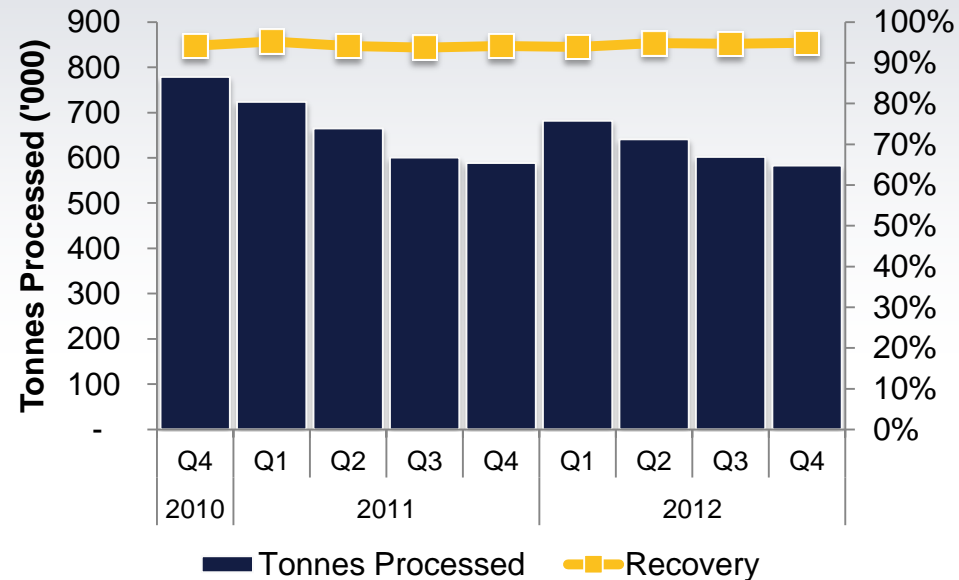
Wassa Production and Costs



**Steady state Wassa mill throughput and recovery**

**Wassa operating costs trending downwards since 2011**

Wassa Processing

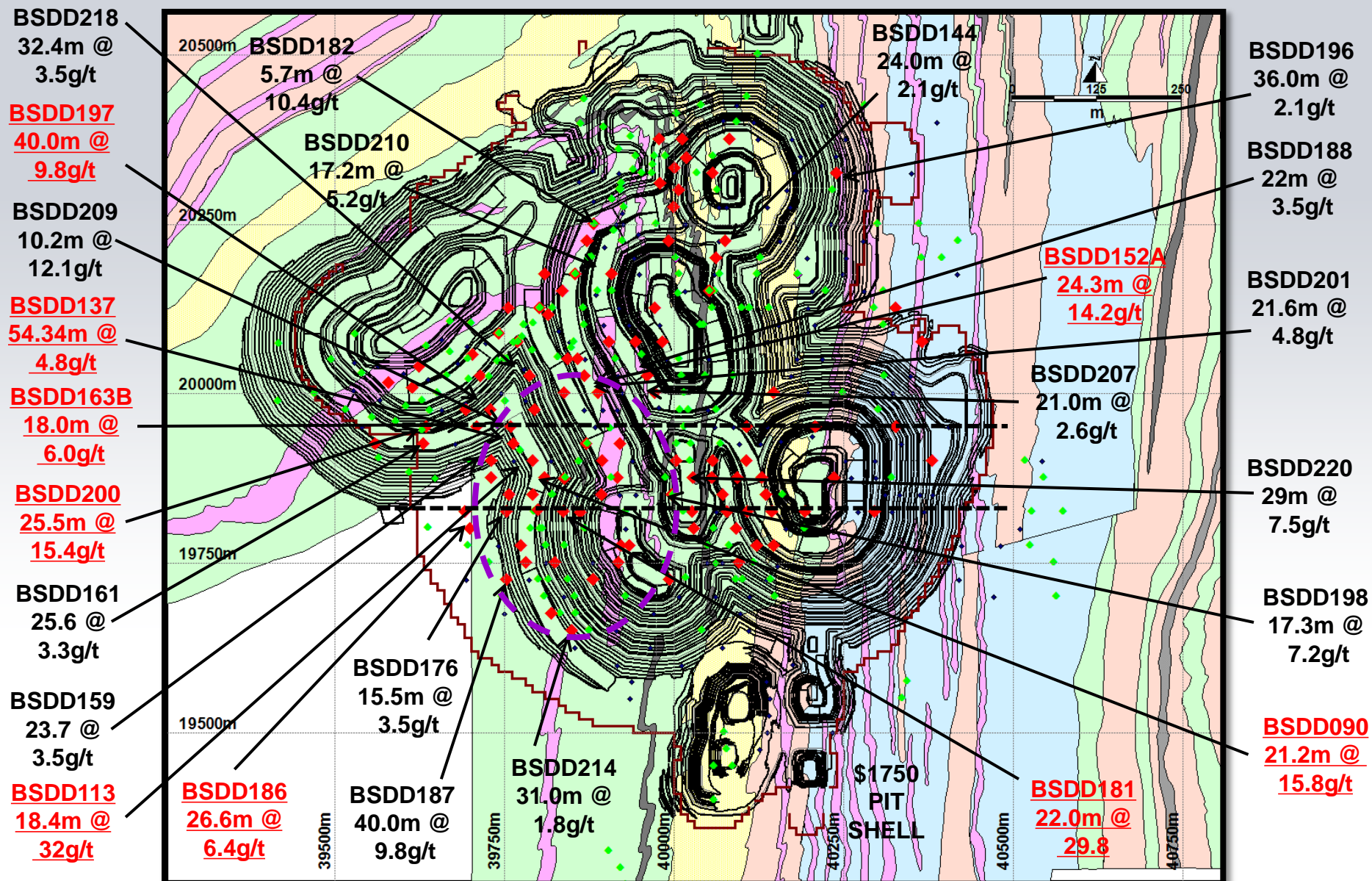


## **Wassa pits – the case for expansion**

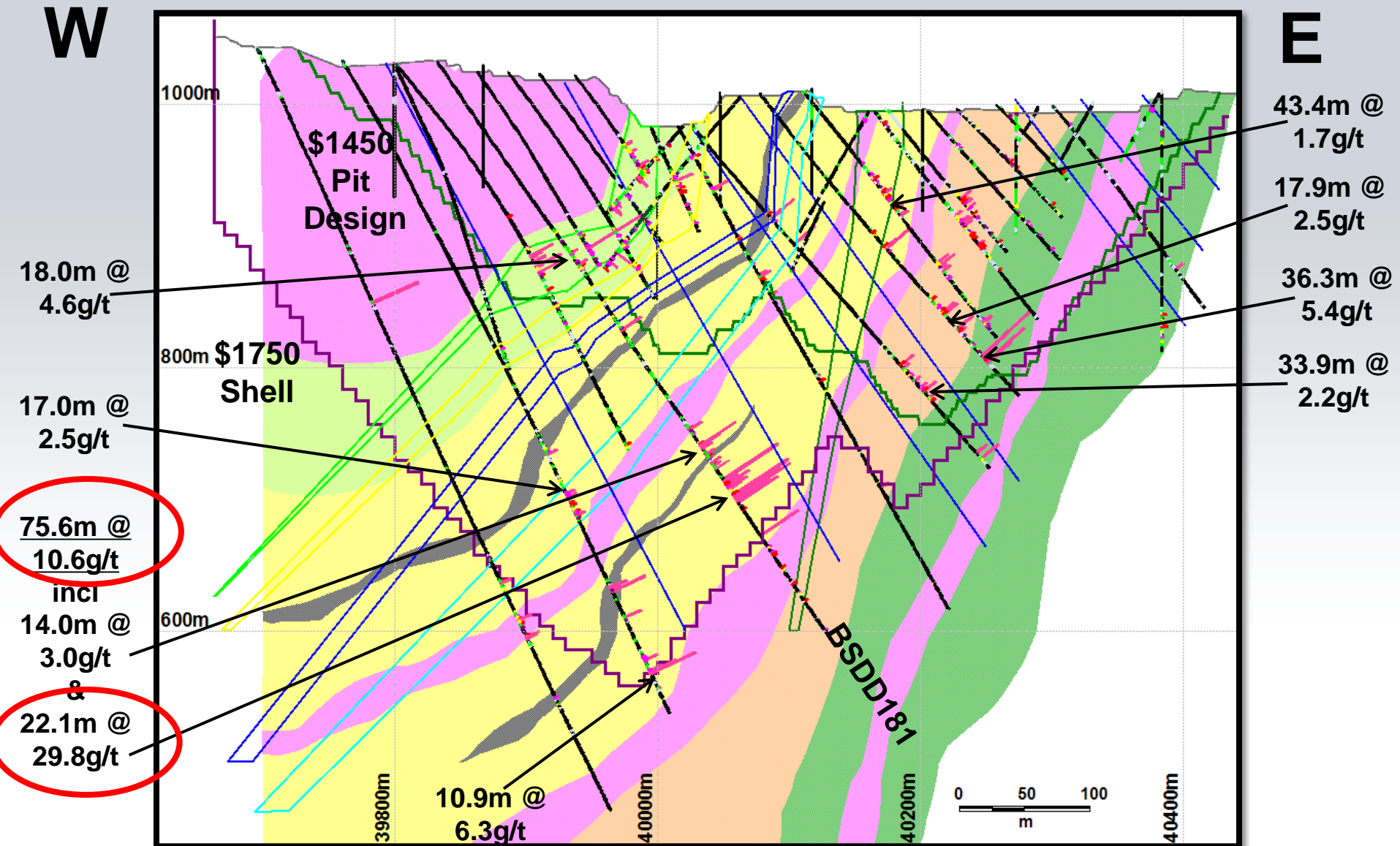
- ★ **The higher grades intersected at depth should have a positive effect on the pits pushing them deeper**
- ★ **The mineralization now extends over 1,000 meters to the south**
- ★ **Continued infill and extensional drilling during 2012**
- ★ **Interim resource models will be completed in June 2013 as drilling advances**
- ★ **Continued exploration success at Wassa may lead to significantly larger resources and a possible mill expansion**



# Wassa Main BS significant results Jan 13



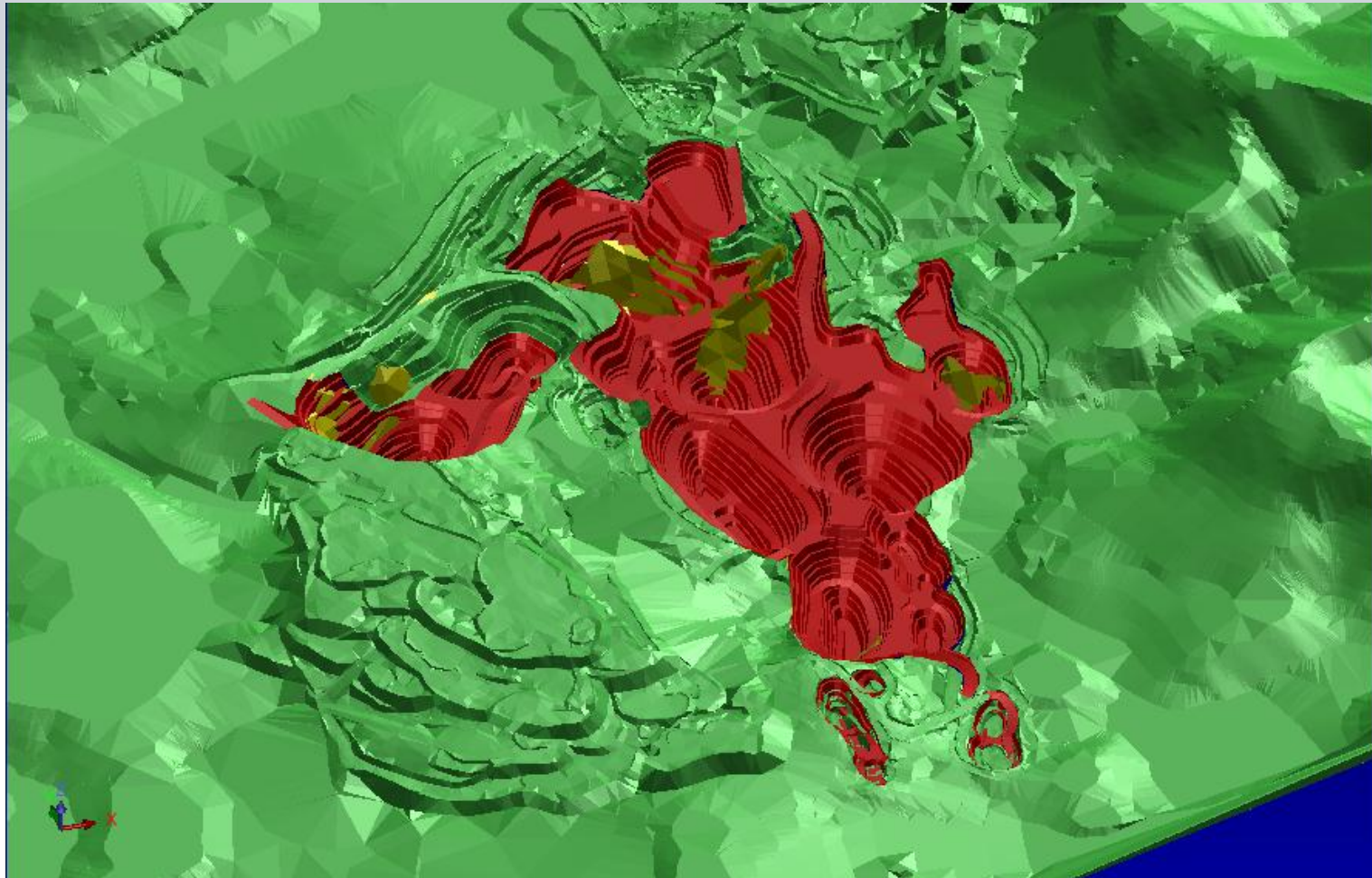
# WASSA (MAIN) SECTION 19825N



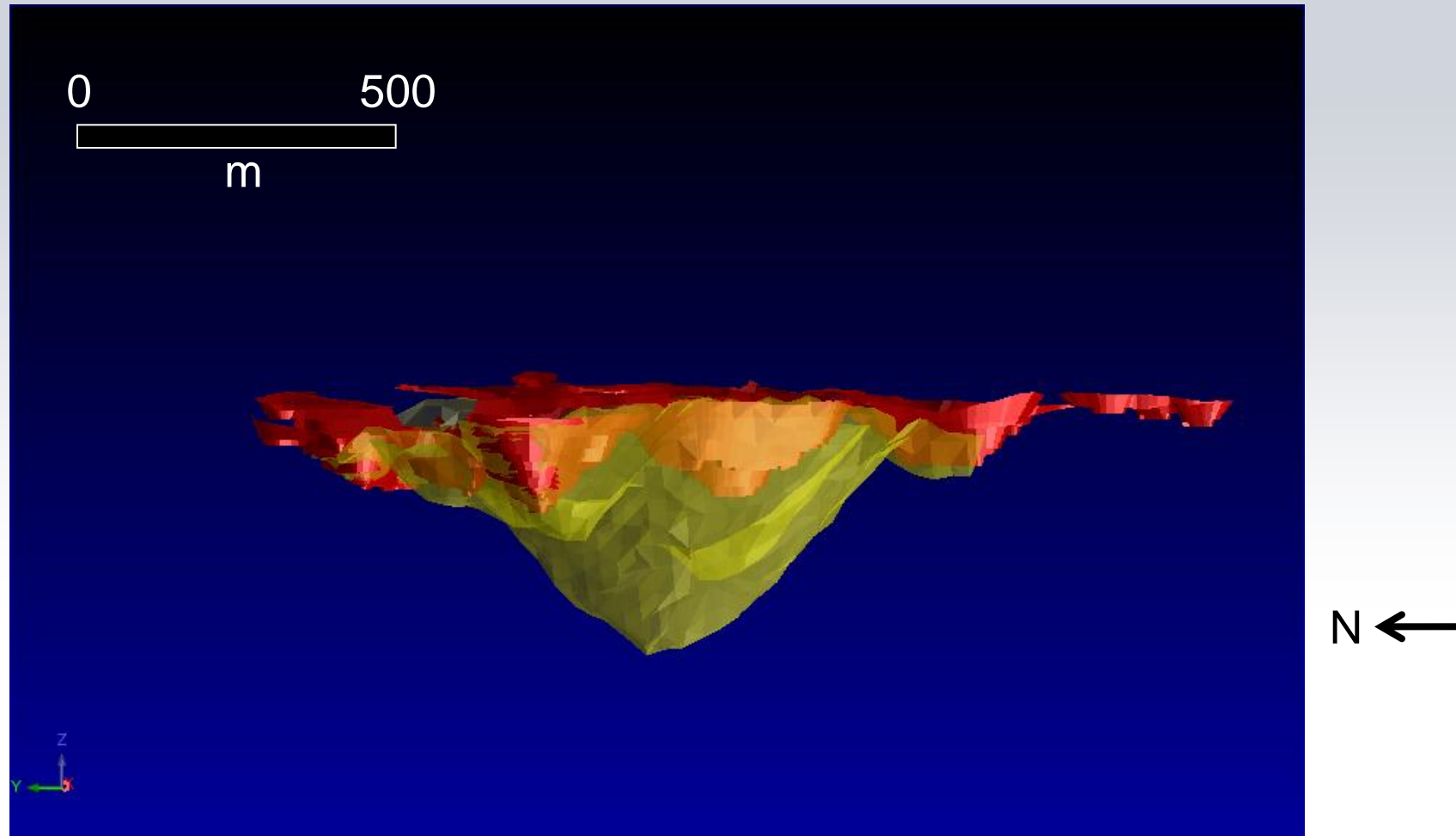


# Wassa Mine Strategy

## ★ Wassa Main Pit Expansion Potential

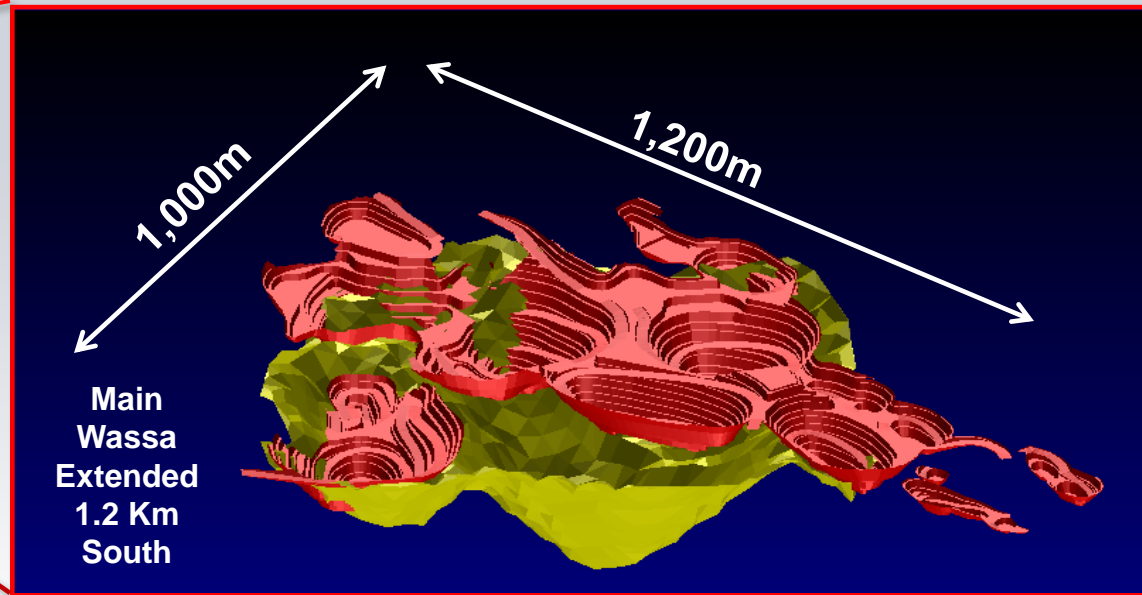
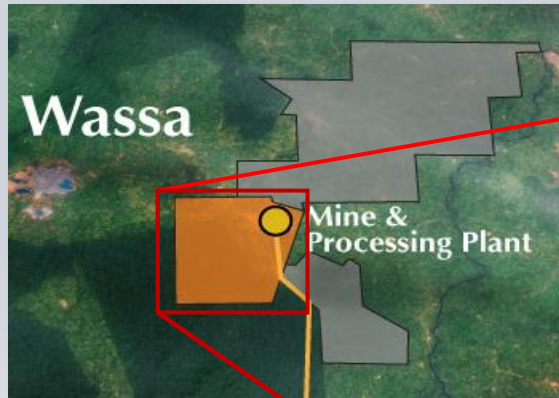


## ★ Wassa Main Pit Expansion Potential





# Wassa Potential Expansion



- ✦ Extensive drilling ongoing
- ✦ Preliminary pit shell suggests a single pit 1,200 m by 1,000 m by 450 m deep
- ✦ Potential to significantly increase resources with further drilling
- ✦ Leads to possible plant expansion scenario

# Plant Upgrade from 2.7 to ~ 6.0Mtpa

## ★ Pre-feasibility study underway

- Estimate Phase 1 debottlenecking cost (+/- 30%) – would bring throughput to 3.0 Mtpa
- Estimate Phase 2 Expansion cost – nominal capacity ~6.0 Mtpa

## ★ Full feasibility study expected in 2014



- ★ **Total incidents have been reduced by 63% (63 vs 170) year over year**
- ★ **Best Mine in Health and Safety and Rescue National Competition 2012**
- ★ **Best Community National Rescue First Aid team 2012**
- ★ **3<sup>rd</sup> Best mine in terms of accident & injury reduction 2012**
- ★ **3<sup>rd</sup> Safest Mine in terms of incidents at start 2012**

# Environmental and Social Responsibility

- ★ GSWL has a strong Environment and Social Responsibility program
- ★ Community engagement programs with community elected committees to identify projects and manage any issues
- ★ Strong performance in the EPA's "AKOBEN" audit program covering environmental and social practices
- ★ Member of ICMC program
- ★ Risk-approached Health and Safety programs with a strong emphasis on worker and community wellbeing



# Benso



## 16 Seater Aqua Privy Toilet Facility



## Overhead Tank





# Subriso Community

## The Community Centre



## Attached Toilet & Urinal



# Togberkrom Relocation – New Township





# Community Youth Apprenticeship Programme





# Rehabilitation at Benso





# Galamsey Impact on Environment





**GOLDEN STAR**



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**Thank You -  
Medase**



# Questions ?

