

**Terwilliger Center for Innovation in Shelter** 

#### EVALUATION OF BEAM MONOLITH PROTOTYPE IN CEBU, PHILIPPINES





Objective

Profile of the houses

**Technical Feasibility** 

**Cost-Efficiency** 

**Community Acceptability** 

Discussion

Next steps

# **Objective**

Evaluate the Beam Monolith prototype in Cebu viability



#### **Methodology: Technical Feasibility**



## Methodology: Community Acceptability

- Structured Interview (social acceptability, affordability, satisfaction)
- Social Acceptability Criteria:



For each question, calculate the total number of responses for each sentiment level (5- strongly agree, 4, agree, 3- somehow agree, 2- disagree, 1- strongly agree)

- Multiply the numerical value of each sentiment level by the number of respondents
- Add the totals, and divide by the total number of respondents

## **Community Acceptability: Respondents Profile**

| Area  | Homeowners | Neighbors | Mason | Hardware |
|-------|------------|-----------|-------|----------|
| Urban | 6          | 6         | 2     |          |
| Rural | 3          | 15        | 5     | 1        |
| Total | 9          | 21        | 7     | 1        |

#### **RECAP - House 1-6 Summary (Urban)**

1. Engr Rey managed and supervised the construction of house 6-9. Engr Rey introduced construction plan and processes to hardware/ contractor.

2. Average Costing of house 1-6 is Php **Ph 28,667** (USD 511.01) vs. the original **16,829.55** (USD 300).

- The actual cost is **70% higher** than cost parameters of the design (USD 300)
- Willingness to pay for solution is mixed with price point range between PHP 20k to 30k (USD 360 to 540)
- 3. Social Acceptability:
- Top feature consideration of beam monolith (households): easy to install, durability and strength and materials available and easy to find at nearest store (4.7/5)
- Top feature consideration of beam monolith (artisan): easy to install, materials available and easy to find at nearest store (5/5)



## Beam Monolith in South Cebu

Homeowner: Mrs. Neri Abella (House 7)

Homeowner: Mrs. Sharon Racoma (House 8)

Homeowner: Mrs. Roxanne Racoma and Mr. Jezzrel Garcia (House 9)

Homeowner: Mrs. Abella (House 7)



Pictures before construction: August 2023



Pictures before construction: August 2023



Pre fabrication at WRJE3 Hardware in Carcar (August 28)





• 10mmdia stirrups



## House 7: Technical Assessment



House 7: August 28, 2023 to Sept 1, 2023







Washing of rebars to get rid of dust/mud before pouring concrete

Consolidation & compaction of fresh concrete





















**House 7 Construction design** KIN CHITTLE SCHEEDLE PROJECT : HOUSE # 04 (A= 18.38 m) : #01 DATE RPE 0.20m CUDM 10 S EOLUMIN YF 0.10 × 6 200m C.42m 0.60m 0.50M 0.45m 4.15 0.20m NZ O. COM A TIES FOOTING 0.50M 4 Frun CONTRETE SPACERS 40DE "X" "V" HOCK CUT STRAIGHT EXCESS DEFICIT REMARKS PCS USE DESCRIPTION BEND FOOTING= 4-10 MARIE, 633 0.45 FOOTING= 4-10 MARIE, 633 0.45 4 8905 × 4 1975 = 32995 Bury 7-124 × 6.04 , 6: 3-14×4 cm 1-14×3.3cm 8pcs ×4-11=32pcs V 7-125×6cm 1-125×3.60m 8-14 ×610, 510= Gure "+" count 8- 12 may 633 1-20m 1.05m alsm 6 19 × 4 = 24 pcs Get 5 - 100×6.04 1-100× 1.28 m from "B" THEF 6- 101140,633 1.18m 0.12/0.12 0.10



### FINANCIAL/ECONOMIC/COST-EFFECIENCY

- How close is the solution to the original design US\$300 dollar?
- Are the household willing to pay the BEAM Monolith solution?
- How much is households' willingness to pay?

| st Sub<br>silienc | bmission Template for Challenge 9934298 - Habitat for Humanity Challenge: Increasing<br>nce to Earthquakes and Typhoons for Homes with No Foundations |          |            |            |             | 298.20   |                    |
|-------------------|---|----------|------------|------------|-------------|----------|--------------------|
| ID #              | Description   | Quantity | Unit       | Unit Price | Cost (USD)  | Subtotal | Remarks            |
| . Mate            | rial Costs  |          |            |            |             | 101.70   |                    |
| 1                 | Cement  | 7        | 40-kg bags | 5.00       | 35.00       |          | 1 cubic meter conc |
| 2                 | Sand  | 0.50     | cu. m.     | 18.00      | 9.00        |          | 1 cubic meter conc |
| 3                 | Gravel  | 1.00     | cu. m.     | 24.00      | 24.00       |          | 1 cubic meter conc |
| 4                 | 10-mm rebar   | 12       | pcs        | 2.60       | 31.20       |          | 1 cubic meter conc |
| 5                 | Bamboo  | 2        | pcs        | 1.25       | 2.50        |          |                    |
| 6                 |   |          |            |            |             |          |                    |
|                   |   |          |            |            |             |          |                    |
| . Labor           | Costs   |          |            |            |             | 196.50   |                    |
| 1                 | Foreman (1 foreman<br>working on four housing<br>units)   | 3        | man-days   | 12.00      | 36.00       |          |                    |
| 2                 | Mason   | 9        | man-days   | 8.00       | 72.00       |          |                    |
| 3                 | Steel man   | 4        | man-days   | 6.00       | 24.00       |          |                    |
| 4                 | Helper  | 9        | man-days   | 6.00       | 54.00       |          |                    |
| 5                 | Excavation  | 1.5      | cu. m.     | 6.00       | 9.00        |          |                    |
| 6                 | Backfill  | 0.5      | cu. m.     | 3.00       | 1.50        |          |                    |
|                   |   |          |            |            |             |          |                    |
| . Other           | r Costs (if any)  |          |            |            |             | -        |                    |
| 1                 |   |          |            |            |             |          |                    |
| 2                 |   |          |            |            |             |          |                    |
| 3                 |   |          |            |            |             |          |                    |
|                   |   |          |            |            | GRAND TOTAL | 298.20   | PHP 16,344.34      |
|                   |   |          |            |            |             |          | (1USD = P54.81)    |

Costing proposal from UP Diliman: Beam Monolith (Aug 2021) USD 300 = P16,829

| MATERIALS:   |   |   |   |   |  |
|--|---|---|---|---|--|
| DESCRIPTION  | OUANTITY  | U/M   | UNIT PRICE  | AMOUNT  |  |
| Defermed here 12mm v 6m grade 32   | 7   | Ights   | 225   | 1,575.00  |  |
| Deformed bars 12mm x 6m grade 33   | 28  | lehts   | 157   | 4,396.00  |  |
| Deformed bars tomin x on grade 55  | 5   | kgs   | 79  | 395.00  |  |
| Gi Wire # 10   | 18  | bags  | 196   | 3,528.00  |  |
| Cement Portanu   | 35  | bags  | 69  | 2,415.00  |  |
| Gravel 3/A"  | 60  | bags  | 69  | 4,140.00  |  |
| Bhaved marine 1/2" x 4' x 8'   | 1   | shts  | 856   | 856.00  |  |
| CWN # 1 1/2"   | 0.5   | kgs   | 74  | 37.00   |  |
| Lumber coco 2" x 2" x 8'   | 8   | lghts   | 74  | 592.00  |  |
| 0 Consumables  | 1   | lot   | 1000  | 1,000.00  |  |
|  |   |   |   | 18,934.00   |  |
| In the second se | OUANTITY  | MAN DAYS  | RATE  | LABOR COST  |  |
| MANPOWER:  | 1   | 4   | 700   | 2,800.00  |  |
| 2 CARPENTER /MASON   | 1   | 44.0  | 550   | 2,200.00  | -  |
| B HELPERS  | 2   | ¥.S   | 400   |   | 1000.00  |
|  |   |   |   | 8,200.00  |  |
| EQUIPMENT / TOOLS:   | QUANTITY  | DAYS  | RATE  | COST  |  |
| DEMOLITION HAMMER  | 1   | 2   | 600   | 1,200.00  |  |
| SERVICE VIHICLE FOR DAILY MANPOWER<br>TRANSPORT/ MOVE & DEMOB  | 1   | 74.5  | 800   | * <del>3,200.0</del> 0-   | 4,000,00   |
|  |   |   |   | 4,400.00  |  |
|  |   | -   | -   | 1   | 1  |
| FOURMENT (TOOLS)   | IOT   |   |   | -21.534.00  | 32134.0  |
|  | LOI   | 1   |   | 31,334.00   | 200 10 10  |
| CONTRACTORS PROFIT:  | LOT   |   | 10  | 4 730 10  | 1070   |
|  | Deformed bars 12mm x 6m grade 33 Deformed bars 10mm x 6m grade 33 Generate 33 Generate 34 Gravel 3/4" Plywood marine 1/2" x 4' x 8' CVN # 1.1/2" Lumber coo 2" x 2" x 8' CONSW # 1.1/2" Lumber coo 2" x 2" x 8' CONSW # 1.1/2" LUMDER COO 2" x 2" x 8' CONSWADUES CARPENTER /MASON CARPENTER /MASON CARPENTER /MASON EDITION HAMMER SERVICE VIHICLE FOR DAILY MANPOWER TRANSPORT/ MOVE & DEMOB COTAL COST (MATERIALS, MANPOWER, | Deformed bars 12mm x 6m grade 33         7           Deformed bars 10mm x 6m grade 33         28           Gi Wire # 16         5           Cement Portland         18           Sand Wash         35           Gravel 3/4"         60           Plywood marine 1/2" x 4" x 8"         1           Lumber coco 2" x 2" x 8"         8           O Consumables         1           MANPOWER:         QUANTITY           CARPENTER /MASON         1           CARPENTER /MASON         1           EQUIPMENT / TOOLS:         QUANTITY           DEMOLITION HAMMER         1           SERVICE VIHICLE FOR DAILY MANPOWER         1           STAL COST (MATERIALS, MANPOWER,         1 | Deformed bars 12mm x 6m grade 33         7         Ights           Deformed bars 10mm x 6m grade 33         28         Ights           Gei Wire # 16         5         kgs           Cement Portland         18         bags           Sand Wash         35         bags           Gravel 3/4"         60         bags           Jewre # 1.1/2"         0.5         kgs           Lumber coc 2" x 2" x 8"         1         shts           CONS mables         1         for           MANPOWER:         QUANTITY         MAN DAYS           CARPENTER /MASON         1         4, 4. 6           CARPENTER /MASON         1         4, 4. 6           EQUIPMENT / TOOLS:         QUANTITY         DAYS           DEMOLITION HAMMER         1         2           SERVICE VIHICLE FOR DAILY MANPOWER         1         3, 5           TOTAL COST (MATERIALS, MANPOWER,         1         4, 5 | Deformed bars 12mm x 6m grade 33         7         Ights         225           Deformed bars 10mm x 6m grade 33         28         Ights         157           Gi Wire # 16         5         kgs         79           Cement Portland         18         bags         196           Sand Wash         35         bags         69           Gravel 3/4"         60         bags         69           Plywood marine 1/2" x 4'x 8'         1         shts         856           CWN # 1.1/2"         0.5         kgs         74           Lumber cocc 2" x 2" x 8'         8         Ights         774           Deformables         1         fot         1000         1000           MANPOWER:         QUANTITY         MAN DAYS         RATE           CARPENTER /MASON         1         4, 4, 6         550           CARPENTER MASON         1         4, 4, 5         4000           EQUIPMENT / TOOLS:         QUANTITY         DAYS         RATE           DEMOLITION HAMMER         1         2         600           SERVICE VIHICLE FOR DAILY MANPOWER         1         3800         5800 | Deformed bars 12mm x 6m grade 33         7         Ights         225         1,577.00           Deformed bars 10mm x 6m grade 33         28         Ights         157         4,396.00           Oeformed bars 10mm x 6m grade 33         28         Ights         157         4,396.00           Cernent Portland         18         bags         196         3,528.00           Sand Wash         35         bags         69         2,415.00           Gravel 3/4"         60         bags         69         4,140.00           CVN # 1.1/2"         0.5         kgs         74         37.00           Lumber coco 2" x 2" x8"         8         lghts         74         592.00           Lumber coco 2" x 2" x8"         1         lot         10000         1,000.00           Consumables         1         4         700         2,800.00         2,800.00           CAPRENTER MASON         1         4,4.5         550         2,200.00         3,200.00 |

H7 Actual Cost from WRJE Hardware P 38,000 (USD 690.91) – Sept 2023 Variance: P21,171 over than original (125% increase)

#### House 7: Social Acceptability Assessment



#### House 7: Overall Perception and Satisfaction



1.8 I feel Beam Monolith retrofit foundation 1.9 I would recommend the beam monolith 1.10 I am satisfied with the workmanship 1.1 better than my previous constructed house to my family, friends, and neighbors. of the contractor in constructing the beam monolith.

1.11. Overall, I am satisfied with Beam Monolith retrofit foundation.

#### • Homeowner (House 8): Mrs. Racoma











## House 8: Technical Assessment









## House 8: Technical Assessment











### FINANCIAL/ECONOMIC/COST-EFFECIENCY

- How close is the solution to the original design US\$300 dollar?
- Are the household willing to pay the BEAM Monolith solution?
- How much is households' willingness to pay?

| st Submission Template for Challenge 9934298 - Habitat for Humanity Challenge: Increasing silience to Earthquakes and Typhoons for Homes with No Foundations |   |          |            |            |             | 298.20   |                       |
|--|---|----------|------------|------------|-------------|----------|-----------------------|
| ID #   | # Description   | Quantity | Unit       | Unit Price | Cost (USD)  | Subtotal | Remarks               |
| L. Mate  | erial Costs   |          |            |            |             | 101.70   |                       |
| 1  | Cement  | 7        | 40-kg bags | 5.00       | 35.00       |          | 1 cubic meter concret |
| 2  | Sand  | 0.50     | cu. m.     | 18.00      | 9.00        |          | 1 cubic meter concret |
| 3  | Gravel  | 1.00     | cu. m.     | 24.00      | 24.00       |          | 1 cubic meter concret |
| 4  | 10-mm rebar   | 12       | pcs        | 2.60       | 31.20       |          | 1 cubic meter concret |
| 5  | Bamboo  | 2        | pcs        | 1.25       | 2.50        |          |                       |
| 6  |   |          |            |            |             |          |                       |
| 2. Labo  | r Costs   |          |            |            |             | 196.50   |                       |
| 1  | Foreman (1 foreman<br>working on four housing<br>units) | 3        | man-days   | 12.00      | 36.00       |          |                       |
| 2  | Mason   | 9        | man-days   | 8.00       | 72.00       |          |                       |
| 3  | Steel man   | 4        | man-days   | 6.00       | 24.00       |          |                       |
| 4  | Helper  | 9        | man-days   | 6.00       | 54.00       |          |                       |
| 5  | Excavation  | 1.5      | cu. m.     | 6.00       | 9.00        |          |                       |
|  | 6 Backfill  | 0.5      | cu. m.     | 3.00       | 1.50        |          |                       |
| 3. Othe  | er Costs (if any)                                       |          |            |            |             | -        |                       |
| 1  |   |          |            |            |             |          |                       |
| 2  |   |          |            |            |             |          |                       |
| 3  |   |          |            |            |             |          |                       |
|  |   |          |            |            | GRAND TOTAL | 298.20   | PHP 16,344.34         |
|  |   |          |            |            |             |          | (1USD = P54.81)       |

Costing proposal from UP Diliman: Beam Monolith (Aug 2021) USD 300 = P16,829

| -          | MATERIALS:  |                    |             |            |            |
|------------|---|--------------------|-------------|------------|------------|
| /N         | DESCRIPTION   | QUANTITY           | U/M         | UNIT PRICE | AMOUNT     |
| 1          | Deformed bars 12mm x 6m grade 33  | 7                  | Ights       | 225        | 1,575.00   |
| 2          | Deformed bars 10mm x 6m grade 33  | 26                 | Ights       | 157        | 4,082.00   |
| 3          | Gi Wire # 16  | 4                  | kgs         | 79         | 316.00     |
| 4          | Cement Portland   | 17                 | bags        | 196        | 3,332.00   |
| 5          | Sand Wash   | 37                 | bags        | 70         | 2,590.00   |
| 6          | Gravel 3/4"   | 60                 | bags        | 70         | 4,200.00   |
| 7          | Plywood marine 1/2" x 4' x 8'   | 1                  | shts        | 856        | 856.00     |
| 8          | CWN # 1.1/2"  | 0.5                | kgs         | 74         | 37.00      |
| 9          | Lumber coco 2" x 2" x 8'  | 4                  | lghts       | 74         | 296.00     |
| 10         | Consumables   | 1                  | lot         | 1000       | 1,000.00   |
|            |   |                    |             |            | 18,284.00  |
|            |   | OLIANTITY          | MANDAVE     | PATE       | LABOR COST |
|            | MANPOWER:   | QUANTIT            | IVIAIN DATS | 700        | 2 800 00   |
| 1          |   | 1                  | 4           | 550        | 2,200.00   |
| 2          | LARPENTER   | 2                  | 4           | 400        | 3,200,00   |
| 3          | HELPERS   | -                  |             |            | 8,200.00   |
|            |   | QUANTITY           | DAVE        | DATE       | COST       |
| -          | EQUIPMENT / TOOLS:  | QUANITY            | DATS        | 600        | 600.00     |
| 1          | DEMOLITION HAMMER   | 1                  | 1           | 000        | 000.00     |
| 2          | SERVICE VIHICLE FOR DAILY MANPOWER  | 1                  | 4           | 800        | 3,200.00   |
|            | TRANSPORT/ MOVE & DEMOD   | 1                  |             |            | 3,800.00   |
|            |   |                    | -           |            | and a      |
|            | TOTAL COST (MATERIALS, MANPOWER,  |                    |             |            | 20.294.00  |
|            | EQUIPMENT / TOOLS):   | LOT                | -           | 12         | 30,284.00  |
|            | CONTRACTORS PROFIT:   | LOT                |             |            | 4,542.60   |
|            | GRAND TOTAL (PHP)   | LOT                |             |            | 34,828.60  |
| Pre<br>Che | pared by: Edward P. Nelmida<br>WRJE 2 CONSTRUCTION SUPPLY<br>scked / Prepared by: English P. Consultan<br>Habitat for Humanit | COMPANY<br>(6 VIVB |             | (          | 350000     |

H8 Actual Cost from WRJE Hardware P 35,000 (USD 648.15) – Sept 2023

#### Variance: P18,656 (USD 345.48) (107% increase)

#### House 8: Social Acceptability Assessment

I can easily upgrade and expand with Beam Monolith retrofit foundation

I feel safe and secure living in the Beam Monolith retrofit foundation

I feel the Beam Monolith retrofit foundation easy to install or construct I feel the materials used in the Beam Monolith retrofit foundation are of good in quality that can last more than 10 years The materials used in the construction of the of Beam Monolith retrofit foundation can easily be found or

Monolith retrofit foundation can easily be found or available in my area.

I feel the design of Beam Monolith retrofit foundation appealing or attractive to me.

I feel the Beam Monolith retrofit foundation durable and strong that can withstand earthquakes and typhoons.



#### House 8: Overall Perception and Satisfaction



1.8 I feel Beam Monolith1.9 I would recommend1.10 I am satisfied withretrofit foundation betterthe beam monolith to mythe workmanship of thethan my previousfamily, friends, andcontractor in constructingconstructed houseneighbors.the beam monolith.

1.11. Overall, I am satisfied with Beam Monolith retrofit foundation.

#### Homeowner: (House 9) Mrs. Racoma







## House 9: Technical Assessment









#### House 9: Technical Assessment



UTW DELLARS ZUHERATE





### FINANCIAL/ECONOMIC/COST-EFFECIENCY

- How close is the solution to the original design US\$300 dollar?
- Are the household willing to pay the BEAM Monolith solution?
- How much is households' willingness to pay?

| st Submission Template for Challenge 9934298 - Habitat for Humanity Challenge: Increasing<br>silience to Earthquakes and Typhoons for Homes with No Foundations |   |          |            |            | 298.20      |          |                     |
|---|---|----------|------------|------------|-------------|----------|---------------------|
| ID #  | Description   | Quantity | Unit       | Unit Price | Cost (USD)  | Subtotal | Remarks             |
| 1. Mate   | rial Costs  |          |            |            |             | 101.70   |                     |
| 1   | Cement  | 7        | 40-kg bags | 5.00       | 35.00       |          | 1 cubic meter concr |
| 2   | Sand  | 0.50     | cu. m.     | 18.00      | 9.00        |          | 1 cubic meter concr |
| 3   | Gravel  | 1.00     | cu. m.     | 24.00      | 24.00       |          | 1 cubic meter concr |
| 4   | 10-mm rebar   | 12       | pcs        | 2.60       | 31.20       |          | 1 cubic meter concr |
| 5   | Bamboo  | 2        | pcs        | 1.25       | 2.50        |          |                     |
| 6   |   |          |            |            |             |          |                     |
|   |   |          |            |            |             |          |                     |
| 2. Labo   | Costs   |          |            |            |             | 196.50   |                     |
| 1   | Foreman (1 foreman<br>working on four housing<br>units) | 3        | man-days   | 12.00      | 36.00       |          |                     |
| 2   | Mason   | 9        | man-days   | 8.00       | 72.00       |          |                     |
| 3   | Steel man   | 4        | man-days   | 6.00       | 24.00       |          |                     |
| 4   | Helper  | 9        | man-days   | 6.00       | 54.00       |          |                     |
| 5   | Excavation  | 1.5      | cu. m.     | 6.00       | 9.00        |          |                     |
| 6   | 6 Backfill  | 0.5      | cu. m.     | 3.00       | 1.50        |          |                     |
|   |   |          |            |            |             |          |                     |
| 3. Othe   | r Costs (if any)  |          |            |            |             | -        |                     |
| 1   |   |          |            |            |             |          |                     |
| 2   |   |          |            |            |             |          |                     |
| 3   |   |          |            |            |             |          |                     |
|   |   |          |            |            | GRAND TOTAL | 298.20   | PHP 16,344.34       |
|   |   |          |            |            |             |          | (1USD = P54.81)     |
|   |   |          |            |            |             |          | (1USD = P54         |

Costing proposal from UP Diliman: Beam Monolith (Aug 2021) USD 300 = P16,829



POBLACION 1, CITY OF CARCAR PROVINCE OF CEBU

Project :Beam Monolith for House # 03: Mrs. Roxane Racoma and Mr. Jezzrel Garcia Address: Brgy Kanasuhan, Lower Tindahan, Carcar, Cebu

|     |   |          | -        |                |   |
|-----|---|----------|----------|----------------|---|
|     | MATERIALS:  |          |          |                |   |
| C/N | DESCRIPTION   | QUANTITY | U/M      | UNIT PRICE     | AMOUNT  |
| 1   | Deformed bars 12mm x 6m grade 33  | 7        | Ights    | 225            | 1,575.0                                       |
| 2   | Deformed bars 10mm x 6m grade 33  | 25       | lghts    | 157            | 3,925.0                                       |
| 3   | Gi Wire # 16  | 4        | kgs      | 79             | 316.0   |
| 4   | Cement Portland   | 17       | bags     | 196            | 3,332.0                                       |
| 5   | Sand Wash   | 37       | bags     | 70             | 2,590.0                                       |
| 6   | Gravel 3/4"   | 60       | bags     | 70             | 4,200.0                                       |
| 7   | Plywood marine 1/2" x 4' x 8'   | 1        | shts     | 856            | 856.0   |
| 8   | CWN # 1.1/2"  | 0.5      | kgs      | 74             | 37.0  |
| 9   | Lumber coco 2" x 2" x 8'  | 4        | Ights    | 74             | 296.0   |
| 10  | Consumables   | 1        | lot      | 1000           | 1,000.0                                       |
|     |   |          |          | 1              | 18,127.0                                      |
| -   |   |          |          |                |   |
|     | MANPOWER:   | QUANTITY | MAN DAYS | RATE           | LABOR COST                                    |
| 1   | CIVIL FOREMAN   | 1        | 3        | 700            | 2,100.00                                      |
| 2   | CARPENTER   | 1        | 3        | 550            | 1,650.00                                      |
| 3   | HELPERS   | 2        | 4        | 400            | 3,200.00                                      |
| -   |   |          |          | N. Contraction | 6,950.00                                      |
| 1   | EQUIPMENT / TOOLS:  | OUANTITY | DAYC     |                |   |
| 1   | DEMOLITION HAMMER   | 1        | DATS     | RATE           | COST  |
| -   |   | -        | 1        | 600            | 600.00  |
|     | and a state of the second state   | 100      | 2        | 800            | 2 400 00                                      |
| 2   | SERVICE VIHICLE FOR DAILY MANPOWER<br>TRANSPORT/ MOVE & DEMOB   | 1        | 3        | 800            | 2,400.00                                      |
| 2   | SERVICE VIHICLE FOR DAILY MANPOWER<br>TRANSPORT/ MOVE & DEMOB   | 1        | 3        | 300            | 3,000.00                                      |
| 2   | SERVICE VIHICLE FOR DAILY MANPOWER<br>TRANSPORT/ MOVE & DEMOB   | 1        | 3        | 300            | 3,000.00                                      |
| 2   | SERVICE VIHICLE FOR DAILY MANPOWER<br>TRANSPORT/ MOVE & DEMOB   | 1        | -        |                | 3,000.00                                      |
| 2   | SERVICE VIHICLE FOR DAILY MANPOWER<br>TRANSPORT/ MOVE & DEMOB<br>TOTAL COST (MATERIALS, MANPOWER,<br>EQUIPMENT / TOOLS):  | LOT      | -        | 800            | 2,400.00                                      |
| 2   | SERVICE VIHICLE FOR DAILY MANPOWER<br>TRANSPORT/ MOVE & DEMOB<br>TOTAL COST (MATERIALS, MANPOWER,<br>EQUIPMENT / TOOLS):<br>CONTRACTORS PROFIT:<br>GRAND ZOYAV (SHIP) |          | -        |                | 2,400.00<br>3,000.00<br>28,077.00<br>4,211.55 |

H9 Actual Cost from WRJE Hardware P 32,000 (USD 592.59) – Sept 2023

#### Variance: P15,171 (USD 270.44) (90% increase)

### House 9: Social Acceptability Assessment

I can easily upgrade and expand with Beam Monolith retrofit foundation

I feel safe and secure living in the Beam Monolith retrofit foundation

I feel the Beam Monolith retrofit foundation easy to install or construct

I feel the materials used in the Beam Monolith retrofit foundation are of good in quality that can last more than 10 years

The materials used in the construction of the of Beam Monolith retrofit foundation can easily be found or available in my area.

I feel the design of Beam Monolith retrofit foundation appealing or attractive to me.

I feel the Beam Monolith retrofit foundation durable and strong that can withstand earthquakes and typhoons.



#### House 9: Overall Perception and Satisfaction



1.8 I feel Beam Monolith 1.9 I would recommend the 1.10 I am satisfied with the 1.11. Overall, I am satisfied retrofit foundation better than my previous constructed house

beam monolith to my family, friends, and neighbors.

workmanship of the with Beam Monolith retrofit contractor in constructing foundation. the beam monolith.

#### **Comments/Observations:**

- It was confirmed/validated through viber communication dated 08/07/2023 that using Grade33 (33,000 psi) Deformed Bars for main reinforcements is adequate per design review.
- WRJE3 submitted cost proposal to every House (with different configuration) for approval to HFHI (serve as formal contractual obligation).
- Pre-Construction technical site meeting as kick-off was initiated to "ranks" only to set expectations as to methods, system, quality, schedule, completion, communications, etc.
- Post-Construction technical meeting was realized after the Sibonga House completion.
- Grade Beam anchorage to the existing wall as observed by Arch't. Francis to strengthen the retrofitted house was not realized due to insufficient length per plan detail.





- Technical site inspection visits if in case natural calamities/disaster occur like earthquake and typhoon to validate sustainability.
- There must be a For Construction Plan as standard duly signed and sealed by Designers and approved by Owner (Habitat for Humanity International).

Recommendation/Conclusions: (by Engr Rey)



# Social Acceptability Assessment

## **Community/Social Acceptability**

Overall perception/satisfaction of households, neighbors, and masons

Recommendations and Feedback from households, neighbors, and masons

![](_page_52_Picture_3.jpeg)

## Methodology

- Structured Interview (social acceptability, affordability, satisfaction)
- Social Acceptability Criteria:

![](_page_53_Figure_3.jpeg)

For each question, calculate the total number of responses for each sentiment level (5- strongly agree, 4, agree, 3- somehow agree, 2- disagree, 1- strongly agree)

- Multiply the numerical value of each sentiment level by the number of respondents
- Add the totals, and divide by the total number of respondents

## **Respondents Profile (n=38)**

| Area  | Homeowners | Neighbors | Mason | Hardware |
|-------|------------|-----------|-------|----------|
| Urban | 6          | 6         | 2     |          |
| Rural | 3          | 15        | 5     | 1        |
| Total | 9          | 21        | 7     | 1        |

![](_page_55_Picture_0.jpeg)

![](_page_56_Figure_0.jpeg)

![](_page_56_Figure_1.jpeg)

 Overall, the social Acceptability of Homeowners is at 4.55.

4.78

4.78

4.78

4.78

- \*For safety and security, more than half (55.56%) have uncertainties as it needs further observation if the foundation can withstand strong winds or earthquakes.
- Those who somehow agree said that the ease of construction and expansion can vary but will hugely depend on the financial resources of the homeowner.

\*note: 2 homeowners cited that the houses are not safe as the thieves can still go inside their houses.

#### Level of Neighbors' Social Acceptability per Criterion n=21

![](_page_57_Figure_1.jpeg)

- Overall, the social acceptability score of neighbors is at **4.58**.
- In general, neighbors view the solution as long-lasting and high-quality. Moreover, they consider it to be simple to install and easy to expand.
- Nevertheless, 23% (5) of the neighbors expressed that installing or expanding would be easy and possible if they have sufficient funds.

.73

.73

4.67

#### Level of Neighbors' Social Acceptability per Criterion n=7

![](_page_58_Figure_1.jpeg)

- Overall, the social acceptability score of neighbors is at 4.79.
- The foundation is ideal, given its durability and quality materials, and is easy to upgrade or extend.
- 2 masons (rural) mentioned that the use of 12mm rebar and 10mm crossbars ensures durability, allowing it to last longer. Additionally, it can be easily constructed by any skilled mason.
- However, 1 mason (rural) mentioned there is a superstitious belief that enclosing an old house with a newly built structure on the existing foundation brings bad luck.

Overall, I am satisfied with the beam monolith foundation.

I am able to provide more value to my customers if I sell quality products or solutions like beam monolith foundation

I think the beam monolith foundation can be economical for buyers, particularly C2 and D.

I and/ or my team in the hardware have been trained or given orientation about the BEAM monolith foundation solution.
I and/ or my team in the hardware have been trained on how to properly install beam monolith foundations.

I feel that the beam monolith foundation is easy to install or construct.

I find the beam monolith foundation good in quality and can last more than 10 years.

I feel the design of the beam monolith foundation appealing.

I feel the beam monolith foundation is durable and strong and can withstand earthquakes and typhoons.

![](_page_59_Figure_8.jpeg)

- The hardware expressed their satisfaction as they think it is a "help" to them to gain additional profit and to the homeowners to build a strong house.
- While the hardware perceives the solution as durable and of quality, it could be noted that they think it is not economically viable for ordinary customers or low-income households.

#### Satisfaction of the Beam Monolith Solution n=37

![](_page_60_Figure_1.jpeg)

![](_page_60_Picture_2.jpeg)

- of the respondents are satisfied with the solution as they perceive it as durable, and the materials used are of high quality.
- The remaining 11% expressed dissatisfaction as they see the solution as costly because it only addresses the foundation.
- One (1) neighbor mentioned that the foundation alone may be strong, yet the additional costs of installing sturdy supporting posts and a high-quality roof can be expensive.

# Would you be willing to pay if the cost is between Php 20,000- Php 35,000?

![](_page_61_Figure_1.jpeg)

![](_page_61_Picture_2.jpeg)

of the participants expressed their willingness to pay for the solution, given that they have additional/extra funds. On the other hand, 14% stated that they would not pay for it, as it is not their top priority and they do not consider it necessary to spend money on.

# Estimated cost of the solution n=35

![](_page_62_Figure_1.jpeg)

\*2 Homeowners did not provide answer

Would you be willing to access any financial services or products for the Beam Monolith retrofit foundation? (n=19 LIH and Neighbors)

![](_page_62_Figure_4.jpeg)

# **Commercial Viability (Hardware)**

When asked about the number of products sold after the completion of the construction of three houses, the participant stated that they currently have no information or data about it. They have not yet monitored or observed any significant changes or differences in sales.

The hardware sees the advantage of the solution as it is available as a package, where they act as service providers and offer the item for sale.

When asked about some ways to improve the way customers understand the inherent value of this solution, the hardware thinks that it is crucial to ensure that they recognize the significance of having a solid foundation. The cost of the solution might be quite high for the average homeowner, and unless they recognize its value, it will never become a priority for them.

When asked about the market approach they are planning to do to promote the solution, they just shared that they are looking forward to sustaining the partnership with Habitat wherein they will serve as contractor for the house assistance provided to LIH.

# Here are a few suggestions provided by the participants:

Consider including the post as homeowners will require some time to complete the construction.

![](_page_64_Picture_3.jpeg)

It would be more beneficial to introduce a solution for homeowners who are in the process of planning to build a house.

![](_page_64_Picture_5.jpeg)

The hardware suggests to continue the project/solution as only 3 homeowners were covered.

![](_page_64_Picture_7.jpeg)

# **Conclusion based on the findings** (Social Acceptability)

- The results demonstrate that the proposed solution is accepted and feasible within society.
- However, it is important to note that some participants have reservations about covering the expense, as they consider it to be costly. Emphasizing that it is not their priority.
- Additionally, the recommendations and feedback provided by the respondents highlight the importance of offering additional support and incorporating the post into the solution.
- Lastly, the hardware has a limited understanding of the solution, perceiving it only as assistance. Moreover, they do not perceive value in promoting the solution since their customers cannot afford it.