

# END-TO-END HOUSING PRODUCTION

## DIGITAL TECHNOLOGIES TO ENABLE MMC



|   |                                   | DIGITAL TECHNOLOGY                                                                                                                                                                                                                                                                                               | MODERN METHODS of CONSTRUCTION (MMC)                                                                                                                                                       |
|---|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | MARKET DEMAND                     | <ul style="list-style-type: none"><li>▪ AI driven demand forecasting</li><li>▪ GIS forecasted housing needs</li><li>▪ Data and demographic analytics feeding demand models</li></ul>                                                                                                                             | Early alignment of <b>product platforms with market needs</b> allows <b>standard modular product ranges</b> and <b>scalable design catalogs</b> .                                          |
| 2 | DUE DILIGENCE                     | <ul style="list-style-type: none"><li>▪ AI driven feasibility tools which <b>assess sites and financial risks</b></li><li>▪ <b>Digital compliance</b> identifying regulatory &amp; legal risks</li><li>▪ <b>Manufacturability integration</b> and modular designs</li></ul>                                      | Feasibility studies include manufacturability checks to validate <b>off-site solutions</b> and <b>industrial platforms</b> early in planning.                                              |
| 3 | DESIGN & ENGINEERING              | <ul style="list-style-type: none"><li>▪ <b>BIM</b> ensures shared, 3D, parametric modelling</li><li>▪ <b>AR / VR</b> enables immersive design</li><li>▪ <b>Digital twins</b> simulate manufacturability and performance</li></ul>                                                                                | Modular, panelized, <b>repeatable design systems</b> are used, and design is optimized for off-site manufacture and assembly <b>via BIM-integrated tools</b> , minimizing labor and waste. |
| 4 | PRE-CONSTRUCTION & PROCUREMENT    | <ul style="list-style-type: none"><li>▪ <b>ERP &amp; cloud platforms</b> integrate procurement, scheduling, and prefabrication</li><li>▪ <b>Connected digital supply chain</b> leveraging IoT tracking and robotics</li></ul>                                                                                    | <b>“Kit-of-parts”</b> design <b>automates</b> factory bills of materials, enables <b>just-in-time delivery</b> , and <b>robotic manufacturing</b> .                                        |
| 5 | CONSTRUCTION                      | <ul style="list-style-type: none"><li>▪ <b>On-site AR &amp; sensors</b> guiding construction in real-time</li><li>▪ <b>IoT</b> monitoring of materials and parts</li><li>▪ <b>Robotics</b> for precision manufacturing</li><li>▪ <b>Project management platforms</b> coordinating safe, rapid assembly</li></ul> | Construction site becomes an <b>assembly hub</b> , with industrialized processes, <b>prefabricated modules</b> , and <b>robotics</b> which enable <b>fast, quality-centric building</b> .  |
| 6 | POST-CONSTRUCTION & COMMISSIONING | <ul style="list-style-type: none"><li>▪ <b>Sensors, barcodes, and digital twins</b> validate building performance</li><li>▪ <b>Enhanced data capture</b> enables digital handovers</li></ul>                                                                                                                     | <b>Standardized modular components</b> and <b>real-time analytics</b> enable smooth, <b>data-rich commissioning</b> and warranty processes.                                                |
| 7 | MAINTENANCE & OPERATIONS          | <ul style="list-style-type: none"><li>▪ <b>IoT</b> monitors building health</li><li>▪ <b>Cloud based dashboards</b> manage facilities</li><li>▪ <b>Analytics data</b> enables predictive maintenance</li></ul>                                                                                                   | Modular elements are <b>designed for easy inspection</b> , upgrade, or replacement, maximizing <b>lifecycle value</b> .                                                                    |
| 8 | END OF LIFE?                      | <ul style="list-style-type: none"><li>▪ <b>Material passports, digital twins, and analytics</b> support adaptive reuse, renewal and recycling</li></ul>                                                                                                                                                          | Products are tracked for <b>disassembly and reuse</b> , enabling <b>circular, regenerative housing production</b> .                                                                        |