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| | **HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs** | | --- | | | | | | | | **PROJECT – Port Headland AP5 Wharf** | | | | | **LOT NUMBER -** | |
| **SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001** | | | | | | | **CLIENT –TAMS Group** | | | | | **LOT CAST DATE** | |
|  | | | **HP:** Hold Point, **WP:** Witness Point | | | | | | | | | | |
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| **Item**  **1.0** | **Approvals and reviews** | | |  | | | | | | | | | |
|  | **Description** | | | **Reference(s)** | **Supporting Documents** | **Acceptance Criteria** | | **Conformance** | | HCC  Sign | TAMS Group  Sign | | Remarks |
| **Method** | **Frequency** |
| 1.1 | Submit Concrete mix design | | | 610.07 (a) (b)  Design spec drawings | Mix design and associated on going testing results | Strength, quality, colour, shrinkage must be as per the relevant contract specification.  Approved mix design code TU604AA62 | | Written | Prior to casting | **HP** | HP | |  |
| 1.2 | Submit ACRS certification of reinforcement  and certification for the tendons | | |  | Current ACRS certificate for all Tendons and reinforcing | Valid certificate provided | | Written | Prior to casting | HP | HP | |  |
| 1.3 | Radiant heat curing with curing compounds | | | 610.23 (h) (g) | MSDS  Complies with AS 3799 | SikaFilm applied during finishing, covers installed after finishing of concrete.  Radiant heat curing will occur until the  Antisol AC sprayed or rolled over the components within 30 minutes of removing formwork. | | Written | Every component | **HP** | HP | |  |
| 1.4 | Submit curing methodology | | | 610.23 (a) | Product TDS, SDS & NATA Certificate | Curing compound meets or exceeds AS3799. Application rates noted. | | Written | Prior to casting | **HP** | HP | |  |
| 1.5 | Submit evaporative retardant (aliphatic alcohol-based) | | | 610.17 (f) | Product TDS & SDS | Application rates noted. | | Written | Prior to casting | HP | HP | |  |
| 1.6 | Submit ITP for review | | | 610.18 (a) (i) | This document | Written acceptance to proceed | | Written | Prior to casting | HP | HP | |  |
| 1.7 | Submit repair procedure for review | | | 610.24 (b)  689.13 | Repair Procedure/ Methodology | Review and approval by Client | | Written | Prior to repairing components | HP | HP | |  |
| 1.8 | Ensure all shop drawings are IFC before casting the components | | | HCC QMP | Stamped shop drawing | Shop drawings are to be IFC and numerical revision | | Written | Prior to casting | HP | HP | |  |
| 1.9 | Stressing Calculations have been submitted for review | | | 622.02 | Stressing Calculations and chart | Stressing calculations are to be reviewed by project consultant | |  | Once before commencement of casting  Reviewed if changes occur during the course of the production | HP | HP | |  |
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| | **HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs** | | --- | | | | | | | | | **PROJECT – Port Headland AP5 Wharf** | | | | | | **LOT NUMBER -** | |
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| **SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001** | | | | | | | | **CLIENT – TAMS Group** | | | | | | **LOT CAST DATE** | |
|  | | **HP:** Hold Point, **WP:** Witness Point | | | | | | | | | | | | | |
|  | |  | | | | | | | | | | | | | |
| **Item** | **Description** | | | **Reference(s)** | **Supporting Documents** | **Acceptance Criteria** | | | **Method** | | **Frequency** | HCC  Sign & Date | NA  Sign & Date | | Remarks |
| **2.0** |  | | **SECTION 2 - Manufacturing Activities** | | | | | | | | | | | | |
| 2.1 | Pre-pour inspection (external) | | | 610.18 (a) (ii & iii) | Nominated authority’s checklist  Relevant shop drawings | | Product dimensions, cast in components, correct reinforcement, cover, lifting anchors etc. conform to structural requirements and specifications.  Moulds/formwork are clean and free from debris.  7 Day notification given via ACONEX. Any changes to be reported within 24 hours prior to the pour. | | | Measured / Visual | Each Unit | **HP** | HP | |  |
| 2.2 | Pre-pour inspection (internal) | | | 610.18 (a) (ii & iii) | HCC QMP  Section 3.12  Check Sheets in the form of the product specific shop drawings  HCC drawings 0001 TO 0254 | | Product dimensions, cast in components, correct reinforcement, cover, lifting anchors etc. conform to shop drawings.  Moulds/formwork are clean and free from debris. | | | Measured / Visual | Each Unit | **HP** |  | |  |
| 2.3 | Check conditions prior to, during and post concrete delivery and placement | | | 610.17 (a-f) | On-line Weather report and forecast | | Ambient temperature **not**: < 5°C or > 35°C  Concrete temperature **not**: < 10°C or > 32°C  Weather condition: conducive to pour  Evaporation Limits for Concreting Operations  The Contractor shall be responsible for measuring and recording the air temperature, relative humidity, concrete temperature and wind velocity (measured one metre above the as placed concrete) at the point of concrete placement from commencement of placing the concrete and continue until curing has commenced. This information shall be used in conjunction with Figure 610.171 to determine the rate of evaporation of water from the freshly placed and unprotected surface of the concrete. The rate of evaporation shall be monitored by the Contractor until such time as curing commences.  When the value of the rate of evaporation as determined from Figure 610.171 exceeds 0.50 kg/m² per hour the Contractor shall take precautions to minimise evaporative moisture losses such as the application of an aliphatic‑alcohol based evaporative retarding compound or controlled fog spray.  Application of evaporative retarding compound is required during pouring of concrete. | | | Measured / Visual | Each Lot | **HP** |  | |  |
| 2.4 | Reinforcing placement and inspection | | | 611 | AS 5100  Component Check Sheets in the form of the product specific shop drawings  HCC drawings 0001 TO 0254 | | Check against relevant shop drawing that all reinforcing bars are installed correctly, at the right centres and in a clean condition.  Reinforcing bars spacing to be no less than 1.5 times the size of the largest aggregate.  Correct bar laps to be observed.  Correct radius in bends. | | | Visual/ measuring | Each component | **HP** |  | |  |
| 2.5 | Cover verification | | | 610.33  610.26  610.46  611.10  AS 2425 | Post-pour Check Sheet in the form of the product specific shop drawings  HCC drawings 0001 TO 0254  AS 5100.5 | | Requirements of the design documents.  all around as per drawings.  Ensure bar chairs comply with AS2425.  (Higher cover for standard form work. Lower cover for rigid formwork with high intensive vibrators fitted to form work.)  Tie wire not to intrude into cover zone.  Maintain cover to rebar during concrete placing.  Cover to be minimum 25 mm all around , 20mm on top (tolerance of 0 to +5mm). | | | Measure cover using measuring tape | Ensure 100% compliance of cover requirement  Is achieved and witnessed  Compliance must be recorded on check sheet drawings | **HP** |  | |  |
| 2.6 | Tendons supply and traceability | | | 622.03  622.02 | AS/NZ 4672, 4672.1.1  Component check sheet | | 15.2mm strands used. ACRS supplied, Coil batch certification recorded, stressing design approved and documented by consulting engineer  Strands Certificate of Compliance  Designs, drawings and De-bond detail plan | | | Visual | All Components | **HP** |  | |  |
| 2.7 | Storage and surface condition of Tendons | | | 622.2 (d) | AS/NZ 4672 | | Coils of wire and strand and assembled tendons shall be stored above ground level and shall be protected from mechanical damage, contamination with harmful substances or other damage until their incorporation into the works.  Wires and strands that show any evidence of damage, kinks or bends shall not be used.  Wires and strands which are heavily corroded or visibly pitted will not be accepted.  Slight surface rusting shall not be a reason for rejection provided that no pitting is visible.  Wire and strand shall be kept free from loose rust, oil, grease, tar, paint, soil or any other harmful substances.  If the wire or strand become contaminated with any substance, it shall be cleaned with suitable equipment and appropriate detergents and/or clean water until all of the contaminant and any detergent has been removed satisfaction of the Superintendent.  Loose rust shall be removed by mechanical or manual methods that do not cause damage to the wire or strand or which impair the bond between the wire or strand and the concrete. | | | Visual | All Coils | **HP** |  | |  |
| 2.8 | Placing Tendons | | | 622.04 |  | | Tendons shall be placed in continuous lengths in the positions shown on the drawings and shall be held in the required position by end-blocks of sufficient strength and stiffness to safely maintain the required force in the tendons.  Tendons shall be de-bonded in the positions shown on the shop drawings.  19mm paper thin plastic sleeves will be used for de-bonding strands.. Grease or other coatings shall not be used for de-bonding.  Tendons shall not be allowed to come into contact with the oiled surface of the formwork. If a tendon is contaminated with oil or other harmful substance it shall be cleaned using an appropriate method in order to ensure that the bond between the tendon and the concrete is unimpaired. Tendons that cannot be cleaned shall be replaced.  Tendons shall not be welded or exposed to heat from welding or other sources.  Where deflected tendons are shown on the drawings, tendons shall be restrained with devices of sufficient strength to hold the tendons in their proper positions without displacement during the placing and compaction of concrete. | | | Visual Inspection | For all components | **HP** |  | |  |
| 2.9 | Tensioning, equipment, anchoring and Tendon force | | | 622.06  622.02 a, b, c and d | Calibration AS2193 | | Equipment  The Contractor shall maintain current calibration certificates conforming to the requirements of AS 2193 Grade B for the jack and pressure gauges or other force measuring devices. Jacks and pressure gauges and other devices shall be calibrated and used as a single unit. Calibration to AS 2193 shall be carried out by a laboratory that is NATA-accredited for that method, and at the appropriate force range.  The power unit shall be adjusted so that the rate of extension of the tendon is within the specified limits. The measuring equipment shall permit measurement of the tendon force prior to lock-off to the degree of accuracy required by AS 2193 Grade B. The measuring equipment used shall permit elongation to be determined to an accuracy of ±2%. The equipment shall prevent unwinding of the strand during tensioning.  The sag take-up force in the tendons shall be measured with equipment which complies with the repeatability and accuracy requirements of AS 2193 Grade B, at a scale mark at which the equipment has been calibrated. The readability requirements of AS 2193 Grade B shall be ignored for the purpose of establishing sag take-up. Sag take-up force shall not exceed 20% of the required tendon force, and shall be not less than 10% of the required tendon force or 10% of gauge capacity, whichever is the greater.  Anchorages  Anchorages shall be of a type that prevents the occurrence of slip during casting and curing operations.  Tendon Force  Before tensioning commences, the Contractor shall calculate the extension corresponding to the required tendon force shown on the drawings. The calculation shall be based on the measured length of the tendon between the tendon anchorages at the end blocks and the modulus of elasticity determined from the sample tested in accordance with Clause 622.02.  The calculations shall include allowances for all losses including slip at anchorages, elastic shortening of the stressing bed, pull-in on transfer of prestress, friction losses and temperature changes.  The calculations shall be reviewed by the designer of the pre-tensioned concrete units who shall certify that the calculations meet the requirements of the specification and the drawings. The Contractor shall provide a copy of the designer’s certification to the Superintendent.  After all tendons have been anchored to the end-blocks (locked off), the force remaining in the tendons at mid-span of the unit shall be the required tendon force stated on the drawings.  The allowable variation of the tendon force shall be ±2%.  Under no circumstances shall the maximum tensioning force exceed the lesser of the rated capacity of the jacking equipment or 80% of the tensile strength of the tendon.  The tensioning force required to achieve the design tendon force shall be determined from the calibration certificate and the actual elongation of the tendon corresponding to the tensioning force shall be recorded. Alternatively, the Superintendent may approve determination of the tensioning force by measurement of the elongation, provided that the limits of variation of the modulus of elasticity of the tendons are satisfactory. In this case, the jacking force shall be recorded.  Should the modulus of elasticity of batches of tendons differ by more than 3%, the required elongation shall be adjusted accordingly.  **Where the difference between the force determined from the calibration certificate and the tensioning force calculated from the elongation exceeds 4%, the Contractor shall nominate some or all of the following remedial steps subject to review by the Superintendent. The Contractor shall suspend stressing until the completion of the Superintendent’s review:**  • re‑calibration of tensioning equipment;  • testing of tendon material to check the modulus of elasticity;  • that tendons be released and restressed (with the adoption of a modulus of elasticity applicable to the second stressing);  • other steps as agreed by the Superintendent. | | | Visual Inspection | For Stressing Jack and Guage | **HP** | HP (If applicable) | |  |
| 2.10 | Tensioning Procedure | | | 622.06 (d) | Refer to HCC tendon tensioning procedure | | Te Tensioning Procedure  **HP** **All stressing operations shall be recorded on the daily stressing sheet**  Tensioning operations shall be performed by suitably trained and experienced personnel.  Tensioning has been carried out in accordance with The Hollow Core Concrete Tensioning procedure document | | | Visual Inspection | For all components | **HP** | HP (Refer stress record Sheet for HPR) | | WP |
| 2.11 | Transfer of prestress | | | 622.08 a, b, c | Post-pour Check Sheet in the form of the product specific shop drawings  HCC drawings | | Transfer of stress will only be permitted after the cylinder testing shows minimum of 40 MPa of compressive strength (as approved by the designer) | | | Visual Inspection | For all components | **HP** |  | |  |
| 2.12 | Calibration certificates for Jack and Guage | | | 622.06 | Calibration certificates | | Calibration certification will be conduct at six monthly intervals. Current certified equipment is being used. | | | Visual Inspection | For all components | **HP** |  | |  |
| 2.13 | Data to be recorded | | | 622.09 | AS/NZ 4672.1  HCC  Prestress Check List | | Ensure the following data is recorded:  • identification number of the unit;  • identification number of each dynamometer, gauge, and jack;  • calibration certificates for each dynamometer, gauge, and jack;  • identification details for each tendon;  • sag take-up force (or pressure) when tendons are marked for measurement of elongation;  • elongation obtained at intervals during tensioning, together with corresponding force (or pressure gauge reading);  • tendon force (or pressure) and elongation obtained on completion of tensioning prior to lock-off;  • elongation after release of jack;  • pull-in;  • compressive strength of concrete at time of transfer of prestress;  • steam curing charts;  • measurement of hog following transfer of prestress.  Completed records shall be forwarded to the Nominated Authority prior to delivery of the pre-stressed units to the site. | | | Measured / Visual  Recorded | Every component | **HP** |  | |  |
| 2.14 | Protection of Exposed ends of Tendons | | | 622.10 | Mega poxy MSDS | | If the ends of tendons are to remain exposed, they shall be wire-brushed to remove rust, loose mortar, grease, dirt and all other harmful material and shall then be coated with a minimum 6 mm thickness of epoxy compound. | | | Visual Inspection | For all components | **HP** |  | |  |
| 2.15 | Concrete delivery | | | 610.16 | Concrete docket | | Correct information on delivery docket | | | Visual | Each Load | **HP** |  | |  |
| 2.16 | Concrete Mix Design | | | 610 | Hanson concrete mix design letter | | TU604AA62 150 Slump | | | Documented | All Components | **HP** |  | |  |
| 2.17 | Concrete slump test | | | 610.16 | AS1012.3.1  Concrete tester’s field sheet | | **150mm** slump = ±30mm (120mm to 180mm) | | | Measured / Visual | Each Load | **HP** |  | |  |
| 2.18 | Concrete compressive strength cylinders made | | | 610.05  610.16 (L) | AS1012.8 | | Sets of 3 cylinders, also one cylinder to be used for early strength verification as required. | | | Visual | 0–10m³ = 1 set  10-25m³ = 2 sets  25-50m³ = 3 sets | **HP** |  | |  |
| 2.19 | Concrete placement | | | 610.18 (a), (d)  610.22 | Daily observation will take place to monitor this process is followed | | Time lag between trucks on site not to exceed 25 minutes  Air bubbles released to surface without segregation of the mix  Ensure segregation of the concrete does not occur by preventing free fall of concrete from anything greater than 2 meters  Care shall be taken to fill every part of the forms or excavations, to force the concrete under and around the reinforcement without displacing it, to work coarse aggregate back from the face, and to remove air bubbles and voids.  Concrete shall be deposited in horizontal layers not more than 350 mm thick.  During and immediately after placing, the concrete shall be effectively compacted by vibrators of adequate size, number and frequency.  Vibration shall be applied to the full depth of each layer and extended  into the top 100 mm of the underlying layer. Vibration shall continue at each point until air bubbles cease to emerge from the concrete, then withdrawn slowly. Concrete shall not be vibrated to the point where segregation of the ingredients occurs.  Where internal vibrators are used, they shall be inserted vertically at at spacings not exceeding 250 mm spacings and shall not be allowed to rest on the steel reinforcement.  Curing shall commence immediately following the progressive completion at any location of final finishing operations.  Thermo Couples shall be placed Three per Unit as agreed with the super intendent.( One central in the Unit, another 25mm from the exposed face and edge of the unit, the third central in the unit 25 mm deep from the exposed face.  Maximum temperature shall not exceed 75 degrees Celsius.  Maximum differential temperature to be no greater than 20 degrees Celsius. | | | Visual | Every Load | **HP** |  | |  |
| 2.20 | Placement of the lifting lugs | | | Certified Shop drawings | Shop drawings for each individual component  drawings | | Ensure all lifters are cast into position to within 20 mm tolerances from the design locations | | | Visual | Every unit | **HP** |  | |  |
| 2.21 | Evaporation retarding compound | | | 610.17 | Product MSDS | | Apply aliphatic alcohol-based compound, as required, during initial finishing of concrete . | | | Visual | Every unit | **HP** |  | |  |
| 2.22 | Concrete finish | | | 610.18 (d) (iii) | - | | Requirements of the Project is exposed washed surface on top and off form class 2 finish to the sides and bottoms of the beams | | | Visual | Every Unit | **HP** |  | |  |
| 2.23 | Early age thermal cracking | | | 610.22 | HCC Thermal monitoring record sheet | | Measures to be taken if least dimension exceeds 500mm thickness and one or, more faces are restrained. Thermal Couplers used, | | | Thermal monitoring | First Unit of each type of beam. If risks are identified, further sampling will be carried out | **HP** |  | |  |

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| | **HOLLOW CORE CONCRETE – ITP for the manufacturing of Stressed deck slabs** | | --- | | | | | | **PROJECT – Port Headland AP5 Wharf** | | | | |  | | | |
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| **SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001** | | | | | **CLIENT –TAMS Group** | | | | |  | | | |
| **HP:** Hold Point **WP:** Witness Point | | | | | | | | | | | | | |
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| **Item** | **Description** | **Reference(s)** | **Supporting Documents** | | **Acceptance Criteria** | **Method** | **Frequency** | HCC  Sign & Date | NA  Sign & Date | | Remarks | |
| **3.0** | **SECTION 3 - Post-Manufacturing Activities** | | | | | | | | | | | | |
| 3.1 | Concrete compressive strength | 610.05 | AS1012.8  Lifting Certificate  HCC drawings | | Requirements of the Project/Unit:  Stripping strength = 40MPa  7 Day strength = 40MPa  28 Day strength = 50MPa | Schmidt Hammer  NATA Laboratory | 0–10m³ = 1 set  10-25m³ = 2 sets  25-50m³ = 3 sets  Note: 3 cyls/ set | **HP** |  | |  | |
| 3.2 | Units labelled | 620.06 | Post-pour Check Sheet in the form of the product specific shop drawings  HCC drawings 0001 TO 0254 | | The identification number, date of casting, the manufacturer’s name or registered mark and the maximum mass shall be marked on every precast unit. | Visual | Each Unit | **HP** |  | |  | |
| 3.3 | Curing (apply Sika Antisol AC curing compound) | 610.23 (d), 610.231  AS3799 | Manufacturer’s TDS & SDS | | 2 coats with a minimum application rate of 0.2 litres/m².Keep record.  Record rate of application.  1st coat to be applied within 30 minutes of stripping form work.  Allow 3 hours between coats.  Check box on label once the second coat is applied.  Curing membrane shall be retained and maintained as per Table 610.231 | Measured / Visual | Each Unit | **HP** |  | |  | |
| 3.4 | Post-pour Inspection | 610.30  610.46 | Post-pour Check Sheet in the form of the product specific shop drawings  HCC drawings 0001 TO 0254 | | Surface finish as per Project requirements (Class 3)  Dimensions as per table 610.463 and 610.464. | Measured / Visual / Photographic | Each Unit | **HP** |  | |  | |
| 3.5 | Cracking or any other imperfections to the product | 610.24 (a) (b)  Table 610.241  687 | Post-pour Check Sheet in the form of the product specific shop drawings  HCC drawings | | Refer to Table 610.241 for acceptable maximum crack widths.  Cracks assessed by a technical specialist with a minimum of 5 years practical experience.  Submit a crack repair procedure prior to any repair works being undertaken.  If cracking is witnessed NCR will be raised and repair procedure selected following an inspection by the NA. | Visual Inspection | For all components | **HP** | HP | | WP | |
| 3.6 | Post pour dimensional checks | 610.46 | Post-pour Check Sheet in the form of the product specific shop drawings  HCC drawings | | Ensure that post pour dimensional checks are carried out.  Cast in items checked and noted.  Concrete finishes are as per design drawings  Curing applied | Measured / Visual | For all components | **HP** |  | |  | |
| 3.7 | Lifting product out of the mould | 620.03 | Refer to shop drawings HCC drawings | | Minimum of 40 MPa strength required before lifting the components out of the mould. | Cylinder crack testing. | Each Lot | **HP** |  | |  | |
| 3.8 | Post pour cover check | 610.34 | Record results on Cover check sheet | | Test 3 square meters out of every 25m2 of surface. 10 tests or measurements must be recorder per 3 square meter sample area. | Written record | Each unit | **HP** |  | |  | |
| 3.9 | Storage and stacking of the bridge planks | 620.07  622 | Rigging and Stacking Design Doc | | Components shall only be lifted by the designated cast- in lifters.  Components will be stacked simply supported by a bearer under each end directly under the cast in lifters.  Maximum of 3 components to be stacked.  Stacking will be in accordance with engineers design  Bearers will be positioned in line with the cast in lifters. Bearers will be placed on a level concreted ground surface. | Visual Inspection | For all components | **HP** |  | |  | |
| 3.10 | Product delivery | 620.08, 610.26 | Delivery Docket(s)  Certificates of Compliance | | Unit(s) to have achieved minimum 28 day compressive strength and must comply with table 610.261 prior to transporting.  Components will be lashed down in accordance with engineers design. Chains will be directly above the bearers under the Beams.  Beam edges will be protected using plastic angels to prevent damage from the tie down chains.  Compliance certificates will be issued the day before delivery of components to site. | Written | Each Unit | **HP** |  | |  | |
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| | **HOLLOW CORE CONCRETE – ITP FOR Smoke Duct Stressed beams** | | --- | | | | | | **PROJECT – WGTP** |  | |
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| **SPECIFICATIONS – VICROADS 600 SERIES and AS/NZS ISO 9001** | | | | | **CLIENT – CPBJH** |  | |
| **HP:** Hold Point, **HP\***: Internal Hold Point, **IP:SP:** Surveillance Point, **WP:** Witness Point | | | | | | | |
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| **4.0** | **SECTION 4 Lot Conformance &Notes** | | | | | | |
| Lot conforms | | | Non-conformances raised for this lot:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | Non-conformances closed out |
| Hollow Core Representative’s Name: | | Aidan Collins 🞏  Balint Djeri 🞏  Chelsy Grieef🞏 | | Hollow Core Representative’s Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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