**Treatment Plan**

See Section 5.0 for Complete Treatment Details

All patients will receive a SOC PET/CT or PET/MR, utilizing any FDA-approved radiotracer for prostate cancer, prior to any treatment planning/delivery. This can be completed during Step 0 registration or up to 16 weeks prior to Step 0 registration. Patients will then be placed into one of two cohorts:

**PET-Negative for Extra-Pelvic Metastases:**
- Arm A: Planned SOC RT + STAD
- Arm B: Planned SOC RT + STAD + Apalutamide

**PET-Positive for Extra-Pelvic Metastases:**
- Arm C: Planned SOC RT + STAD + Apalutamide
- Arm D: Planned SOC RT + STAD + Apalutamide + Metastasis-Directed RT to PET-positive lesions

A repeat PET2 will only be performed in patients who received 18F-fluciclovine for PET1 and were enrolled on Arms C/D. The repeat PET scan (PET2) will be performed at time of PSA progression/clinical concern for progression, or 12 months after completion of enhanced systemic therapy, whichever occurs first.

**NOTES:**
- SOC RT is external beam RT to the prostate bed and pelvic lymph nodes; SOC RT can start anywhere from 7 days prior to STAD initiation up to 3 months after STAD initiation.
- For STAD, see protocol for acceptable GnRH agonist/antagonist (goserelin, leuprolide, triptorelin, relugolix, degarelix); patients should start STAD within 14 days after Step 1 randomization.
- Apalutamide is 240 mg PO (taken whole) once daily for 6 months; must be started within 21 days of starting STAD.
- RT dose and fractionation to the prostate bed and pelvic nodes will follow published and generally accepted standards/be consistent with institutional practice; i.e., 30 Gy in 3 fractions (SBRT) or 50 Gy in 10 fractions (Non-SBRT).