Regional anisotropic structure of the oceanic lithosphere-asthenosphere system provides important constraints on the formation, evolution, and dynamics of oceanic plates. New data from the recent Old ORCA (OBS Research into Convecting Asthenosphere) experiment offer insight into old, oceanic lithosphere in the southwest Pacific. We use ambient-noise surface waves in the short-period band (5-30s) and long-period (20-150s) Rayleigh-waves to image upper mantle structure. Rayleigh-wave phase velocities are measured from teleseismic earthquakes using broadband intra-array cross-correlations and from one year of ambient noise data recorded on the 30-station broadband array that spans a 500x500 km region. From ambient noise, we observe high signal-to-noise fundamental-mode Love waves on the transverse component in the 4-8s period range, fundamental-mode Rayleigh waves in the 15-30s period band, and first-overtone Rayleigh waves in the 5-10s band. Fundamental-mode Rayleigh waves are observed from 20-150s period after tilt and compliance correction. In addition, Rayleigh waves are observed on the instruments' differential pressure gauges. We utilize a spectral-fitting algorithm to measure ambient-noise phase velocities across the frequency band for each wave type and invert the observations for 1-D azimuthal anisotropy and 2-D phase velocity maps within the array footprint. Azimuthal anisotropy is relatively weak with 1-2% 2θ variation in V_{sv} and 1% 4θ variation in V_{sh}. The apparent fast direction is generally oriented North-South in short-periods (5-10s, red arrow), rotated roughly 30° clockwise from the apparent fossil-spreading direction (FSD) suggested by seafloor abyssal-hill fabric (330°). At intermediate periods (40-80s, orange arrow) the fast direction aligns toward apparent plate motion and longest observed periods (80-150s) rotate to the FSD azimuth. In the short-period band we observe approximately 3% spatial variation in phase velocity across the array, with a gradient that correlates with seafloor age. The magnitude of isotropic velocity variation is significantly higher than that observed using comparable analyses on younger Pacific seafloor (NoMelt, Young ORCA), and the apparent anisotropic fabric is significantly weaker. We interpret these results in the context of slower spreading rates.